APPENDIX I.



TO

SECOND REPORT OF COMMITTEE

UPON

THE FEVER HOSPITAL

AND

MUNICIPAL IMPROVEMENTS:

CONTAINING

CORRESPONDENCE RESPECTING THE WARPING AND DRAINING OF THE SALT WATER LAKE
AND THE UNHEALTHINESS OF THE ENVIRONS OF CALCUTTA, ETC.

CALCUTTA:

Bishop's College Press.

1848.

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No. 1.

To THE HONOURABLE SIR J. P. GRANT.

Dear Sir,

The exceeding difficulties of the subject, together with want of time to enter more fully into it, must constitute my excuse for the many deficiencies of the accompanying Note.

I have, however, as far as possible, avoided mere opinions, even those of the ablest authorities; and stated only what I conceive to be the well attested results of operations undertaken with a view to improve climate and agricultural resources in various parts of Europe, where many more examples might be furnished. Unhappily, but little has been done within the tropics on which to ground determinate plans; but perhaps the scientific officers of this City may be able to furnish precise information respecting the System of Draining in actual operation in British Guiana, of which Dr. Fergusson speaks so highly: if so, we may I think rely on it as an example which may with safety be followed.

Yours very truly,
J. R. MARTIN.

Native Hospital,
10th June, 1839

No. 1. (A)

Note on the Draining of the Salt Water Lake.

Next in importance to the Great Works required in and about the City of Calcutta, to render its climate comparatively salubrious, the Clearing of the Sunderbunds and the Draining of the Salt Water Lake claim our notice.

Extending 180 miles South and East of us, and covering a superficies of 20,000 square miles and upwards, the Sunderbunds must necessarily exercise a very powerful influence on the electric condition of our atmosphere; besides loading it with all kinds of exhalations. That the clearing of this vast surface, therefore, would tend greatly to improve our local climate, cannot be doubted by any one who considers the question in reference to the history of this City, or that of the effects of similar operations in other countries. It would open our locality to the free influence of the sea breezes; diminish the moisture of our atmosphere, and greatly purify it. It is a popular as well as medical belief in malarious countries, that by diminishing the humidity of the air we at the same time diminish its capacity for the marsh poison—a watery or moist atmosphere being the active repository and

conductor of such exhalation. When the humidity is dissipated by the noon-day sun, the malaria is checked in progress, possibly in its production. Here we have the reason of Dr. William Fergusson's assertion, that it is "during the cooler temperature of the night that it acquires body, concentration, and power." It is also very remarkable that malarious exhalations are "*certainly lost and absorbed by passing over a small surface of water.*" It is found also, contrary to the vulgar opinion, that in clearing and cultivating tracts such as the Sunderbunds, the air is rendered drier and warmer in summer, and colder in winter, than in such as, from want of cultivation, remain covered with wood and marsh.

If then, to counterbalance some little increase of temperature, we obtain purity, dryness, and freedom of ventilation in our atmosphere, we shall still be very greatly the gainers; for it is not so much from a high range of temperature we suffer, as from the excessive humidity, and other qualities conjoined to it, for so many months of the year, all which tend gradually to undermine, through their united influence, the best and most robust of European constitutions.

he Salt Water Lake

Amidst the obscurity which envelopes the early physical history of this City, it is difficult, if not impossible, to discover the changes that have been effected by time in the condition and extent of the Salt Water Lake; but from Captain Hamilton's notice of it, as well as from tradition, I am induced to believe that in former times it was far deeper, and more extended than we now find it, and indeed, that it came up quite close to the Eastern boundary of Calcutta; and I have even heard of the existence in some Publick Office of an old Map* which so represented it. The reclaiming of the land now covered by the Lake is a measure of great importance; but especially the mode of doing it, as affecting the salubrity of this City.

To reclaim the ground for the purposes of agriculture is easy; but to deprive it of the character of marsh, and thus retain it, is not so; it may therefore be well that I state what medical authors define to be marsh, in so far as it affects human health.

Character of marsh ccording to Dr W. Fergusson.

Dr. William Fergusson, Inspector-General of Hospitals, and the most distinguished of the many writers on this particular subject, states, that "the marsh must cease to be a marsh, in the common acceptation of the word, and the sensible putrefaction of water and vegetables must alike be impossible, before its surface can become deleterious." To render these seemingly paradoxical statements intelligible, Dr. Fergusson gives a review of the circumstances which, under his own observation, attended the British army on various services and expeditions in Holland, the West Indies, Spain, and Portugal.

This distinguished Military Physician states that a previous marshy surface, or rather the previous abundance of water, is an indispensable requisite, in all situations, to the productions and evolvement of the marsh poison; and that a healthy condition of soil is infallibly regained by the restoration of the marshy surface in its utmost vigour of vegetable growth and decay. So unessential does he consider putrefaction, or the humid decay of vegetables, under any sensible or discoverable form, towards the production of miasmata.

The ground of encampment which nearly destroyed the British Army on the plains of Estremadura "was so arid and dry, for want of rain, that the Guadiana itself, and all the smaller streams, had in fact *ceased to be streams*, and were no more than *lines of detached pools* in the courses that had formerly been rivers." Many more instances of aggra-

* Possibly the Survey by Capt. Claude Martin, made it is supposed in the year 1760, and lodged in the Office of the Surveyor General. This Survey points out certain spots of ground in the Lake to which wild Buffaloes resort.—J. M.

vated fevers are given by Dr. Fergusson, in situations "as dry as a brick-ground, with the vegetation utterly burned up."

In all the situations described, but especially in Holland, though the surface was invariably quite dry, water was found a very short way below it. Again, in the West Indies, where Dr. Fergusson, made a topographic health survey in 1815-16 and 17, he found that general dryness of soil is "far from being the ordinary characteristic. The swamp is too often exposed to the continued operation of a tropical sun, and its approach to dryness is the harbinger of disease and death to the inhabitants in its vicinity. On the whole it may truly be said, that although excessive rains will evidently cause the acknowledged wholesome and unwholesome soil to change places for a time in respect to health, a year of stunted vegetation, through dry seasons, and uncommon drought, is infallibly a year of pestilence to the greater part of the West India Colonies.

To assert, after this, that the putrid marsh, which must necessarily, to a certain degree, be a *wet* one, is positively less dangerous than another where no smell exists, will not, I am sure appear paradoxical; for it is only saying, that the first has not yet arrived at the degree of exsiccation that has been found most productive of the marsh poison, and that putrefaction, though it may, and must often, precede and accompany pestilence, is no part of pestilence itself.

Dr. M'Cullock defines marsh to be as follows:

Dr. M'Cullock's definition of marsh.

"The essential character of all marshes and swamps, as far as we yet can decide, is, that the land should be partially inundated, that it should be dry in some places and wet in others, or that pools and dry spots should be intermixed, or that it should be boggy and soft from the mixture of earth and decayed vegetables with water, or that it should be subject to peculiar alterations of moisture and dryness, sometimes amounting to absolute inundation in the first case.

The great importance of the subject will, I trust, excuse the length to which I have carried definitions and descriptions, and I shall now, but with great diffidence, proceed to offer some hints on what I conceive to be the proper mode of proceeding with the Salt Water Lake.

Mode of draining the Lake.

To drain the Lake for the purpose of native agriculture is, as I have said, easy; but to deprive the level grounds of the sources of noxious exhalation is not so. It is not sufficient to convert the ground into a state of soft low meadow land, for the most dangerous exhalations are those which are retained, and occasionally emitted from under a crust of earth during the drying process, whereby they would appear to acquire unusual concentration, and prove the origin of the worst fevers.

Necessity of a thorough draining.

It is necessary that the ground be thoroughly drained, leaving none of the characters of marsh, otherwise it had better be left as it is; its present condition being one of far greater safety than such half-drained soil as that obtained from the marsh of Chartreuse, for instance, near Bordeaux, which caused in the year 1805 alone 12,000 persons to be affected with fever within the city, of whom 3,000 died in five months.

Injury to health at Bordeaux from partial draining.

Different modes of effective drainage.

Two modes of effecting the Drainage suggest themselves; the one by letting in the River during the rains, and thereby gaining a succession of deposits of the river silt, so as gradually to fill the inequalities of the ground now occupied by the lake, and thereby bring it in time to a level with the surrounding land. This would seem the easiest; it imitates the simple operations of nature, and would be the cheapest; but perhaps not the most conducive to health. Another mode is, by a deep and well constructed canal.

so as to effect the drainage; but as even this must, to a certain degree, prove a receptacle for noxious matter, and offer a considerable surface for evaporation, a close line of umbrageous trees should be planted along each side of the canal, as being powerfully attractive of marsh exhalation.

This property in trees was practically known to the ancients,* and is now beneficially exemplified in Demerara, and other parts of Guiana, "where the humid heat cherishes the seeds of disease." Dr William Fergusson states, that the marsh poison can with difficulty be separated from trees; "and in the territory of Guiana, particularly, where these trees abound, it is wonderful to see how near *to leeward* of the most pestiferous marshes the settlers, provided they have this security, will venture, and that with impunity, to place their habitations."

Great importance of the subject as affecting publick health.

The ground cleared from water, should be well ploughed and cultivated, the ploughing to be done during the heaviest rain, so as to prevent exhalation; for it is during a certain stage of the *drying process,* that marsh exhalation is most concentrated; and it has been observed in many countries, that the drying up of brackish water is more injurious than that of either salt or fresh alone. A succession of crops purifies and evaporates the soil, and thereby obviates exhalation; but they should not be of rice, or such crops as require profuse irrigation. The want of attention to some of the precautionary measures above hinted at, has neutralized the advantages that would otherwise have resulted from extensive draining executed in some parts of France and Italy; and I have only thus long dwelt on that of the Salt Water Lake, because I believe its proper performance to be a matter of great importance to this City, as far as regards the prevention of disease; and I need not here insist on the superior efficacy of *preventive* measures, such as have advanced in our own country apace with our civilization, and altogether banished from us some of the severest calamities that have ever afflicted the human race.

Conclusion of Dr Fergusson.

To conclude this part of the subject, I shall state the remedy for the existing state of the Sunderbunds and Salt Water Lake in the words of Dr. William Fergusson, believing that it applies with equal force here as in the western hemisphere. It is cultivation, which he says, acts, by ever "opening the surface for the escape of pestilential gases, and exhausting the morbific principle by a constant succession of crops; for wherever malaria prevails, the uncultivated savannah, even though used for pasture, becomes infinitely more pestiferous than the plantation, and the depopulated country falls completely under its dominion. With the aid of the purifying sea-breeze, this course at the British colony of Demerara, within six degrees of the equator, has succeeded in rendering the cultivated portion of the deepest and most extensive morass probably in the world, an healthy, fertile, and beautiful settlement. I shall not here enter into a detailed account of the astonishing system of tide and floodgate drainage by which this delightful result has been established and kept up, but hasten to a conclusion.

Results of draining operations in other countries.

Having stated my general opinion on the modes of effecting the clearing and draining of the grounds in our vicinity, and especially on that of the Salt Water Lake, I shall proceed to state briefly what is known practically of the effects of similar operations in other countries, such information being more useful than mere opinions, however ably set forth.

It is a subject of regret that the physical history of ancient times is even more im-

* Regond de L'Isle says of the malaria of Italy, that various obstacles form barriers which they cannot pass, and against which they deposit themselves

perfect than the political history; and in the place of exact and uninterrupted records of natural phenomena, from which alone any safe conclusions can be drawn, we have only scattered notices; yet these, such as they are, can be rendered of great use by means of comparison. It is only by receding upwards from our own time, and thus discovering a gradually greater prevalence of disease; and again in finding the amelioration reversely following very accurately the progress of agricultural improvements, that the whole conclusion appears to be amply justified. Examples of the latter are without number in every European country, but comparatively little has been done within the tropics.

There can be no doubt that the forests of the Apennines, and in Etruria and Latium, from their great extent in ancient times, caused an increase of rain, and consequently large accumulations of Water in the low grounds, which would still further increase the coldness of the atmosphere: indeed, it is evident from the language of the ancient writers, that, in their days, the cold of the Roman winter was greater than it is at present. Again, the cold of winter is perfectly consistent with great heat in the summer; and though the summer heat of Italy may have been much the same in ancient times as it is at present, yet the difference between the temperature of summer and winter, must have been much greater than it is now. Dr. Arnold, whose history of Rome is here referred to, considers at some length the question. Whether the greater cold of winter, and the greater extent of wood and undrained waters which existed in the times of the Romans, may not have had a favorable influence in mitigating that Malaria which is now the curse of so many parts of Italy, and particularly of the immediate neighbourhood of Rome.

Dr. Arnold on the Campagna of Rome.

"On a subject so imperfectly understood, even by those who have had the fullest experience, it were most unbecoming in a foreigner to speak otherwise than with the greatest diffidence. We know, however, that the Campagna of Rome, which is now almost a desert, must, at a remote period, have been full of independent Cities; and although the greater part of these had perished long before the fourth century of Rome, yet even then there existed Ostia, Laurentum, Ardea, and Antium on one side, and Veii and Cære on the other, in situations which are now regarded as uninhabitable during the Summer months; and all the lands of the Romans, on which they, like the old Athenians, for the most part resided regularly, lie within the present range of the Malaria."

Some have supposed, that although the climate was the same as it is now, yet the Romans were enabled to escape from its influence, and their safety has been ascribed to their practice of wearing woollen next to the skin, instead of linen or cotton. But not to notice other objections to this notion, it is enough to say that the Romans regarded unhealthy situations with the same apprehension as their modern descendants: it is one of the first cautions given by Cato and Varro to a man going to purchase land, that he should buy only where the air is healthy; "otherwise," says Varro, "farming is nothing else than a mere gambling with life and property." The truth seems to be, that the Malaria, although well known and extremely fatal, was much more partial than at present, and that many spots which are now infected, were formerly free from it. "The whole of Latium," says Strabo, "is a flourishing and very productive country, with the exception of a few spots near the coast, which are marshy and unhealthy." And again, when speaking expressly of the Campagna between the Alban hills and Rome, he says, "that the parts towards the Sea are not so healthy—but that the rest is a good country to live in, and well cultivated accordingly." "Now although this is probably going too far, for the unhealthy spots could not have been confined altogether to the Sea-coast, yet with every allowance

for exaggeration and careless writing, this is a description of the Campagna which no man in his senses would think of giving now.

Cicero and Livy on the same subject.

On the other hand, Cicero and Livy both speak of the immediate neighbourhood of Rome as unhealthy, but at the same time they extol the positive healthiness of the City itself; ascribing it to the hills which are at once airy themselves, and offer a screen to the low grounds from the heat of the sun. Bunsen, also, after an experience of many years, gives a favorable account of the healthiness of the City itself. "The site of Rome," he says, "taken generally, may be called healthy;" it is true, that one of the most unhealthy parts of modern Rome, the Piazza di Spagna, and the slope of the Pencian hill above it, was not within the limits of the ancient city. Yet the praise of the healthiness of Rome must be understood rather comparatively with that of the immediate neighbourhood, than positively. Rome in the summer months, cannot be called healthy, even as compared with the other great cities of Italy, much less if the standard be taken from Berlin or from London.

Important conclusions of Dr. Arnold.

Again, the neighbourhood of Rome is characterized by Livy as a "pestilential and parched soil." The latter epithet is worthy of notice, because the favourite opinion has been that the Malaria is connected with Marshes and with moisture; but it is precisely here that we may find, I think, the explanation of the spread of the Malaria in modern times. Even in Spring nothing can less resemble a Marsh than the present aspect of the Campagna; it is far more like the down country of Dorsetshire; and as the Summer advances, it may well be called a dry and parched district. But this is exactly the character of the Plains of Estremadura, where our soldiers suffered so grievously from Malaria Fever in the Autumn of 1809. In short, abundant experience has proved, that when the surface of the ground is wet, the Malaria poison is far less noxious than when all appearance of moisture on the surface is gone, and the damp makes its way into the atmosphere from a considerable depth under ground. After a wet and cold summer, in 1799, when the whole face of the country was nearly flooded with water, the British army remained the whole Autumn in one of the most unhealthy parts of Holland, without suffering in any remarkable degree from Malaria fever. But in 1809, when the summer had been hot and fine, every one remembers the deadly effect of the Autumn fevers on the soldiers who were holding Walcheren. If then more rain fell in the Campagna formerly than is the case now; if the streams were fuller of water, and their course more rapid; above all, if owing to the uncleared state of central Europe, and the greater abundance of wood in Italy itself, the summer heats set in later, and were less intense, and more often relieved by violent storms of rain, there is every reason to believe that the Campagna must have been far healthier than at present; and that precisely in proportion to the clearing and cultivation of central Europe, to the felling of the woods, the shrinking of the streams, and the disappearance of the water from the surface, has been the increased unhealthiness of the country, and the more extended range of the Malaria.

It must be observed also that the present desolation of the Campagna, and even that comparative want of population which prevailed in it during the latter times of the Roman Republic and under the Empire, are not wholly to be attributed to Physical causes. The aguish districts of England continue to be inhabited, nor have the terrors of the yellow fever driven men away from the unhealthiest situations of the West Indies, or from Vera Cruz, Acapulca, or Carthagena.

The old Cities of the Campagna would have continued to defy the Malaria; their

population would have been kept down indeed; many of their children would have died young, and the average length of human life would have been far short of threescore years and ten; but men do not readily leave their country, and they would have continued as their fathers had done before them, to struggle with disease and death. When however, political causes had destroyed the Cities of the Campagna, one after the other, and the land became the property of Roman citizens; when again, at a latter period the small properties disappeared, and the districts fell into the hands of a few individuals, then it was natural that those who could afford to live where they choose, should not fix themselves in a spot of even partial unhealthiness, and thus a great part of the Campagna was left only to the slaves by whom it was cultivated. In modern times, when slave labour was no longer to be had, and there were no attractions strong enough to induce a free population to migrate from their homes to an unhealthy district, the Campagna has remained a wilderness, and its harvests are reaped by a temporary immigration of labourers from other parts of the country. To re-people it under such circumstances, is far more difficult than to keep up a population already existing; and if, as I believe, the physical state of the Campagna has become more and more unfavorable, it seems likely, without some extraordinary advances in our knowledge of the Malaria, and in our ability to combat it, to remain a wilderness for ever.

Disorders produced by Malaria accompanying the hot weather.

The disorders produced by Malaria, whether more or less fatal, so regularly accompanied the return of hot weather, that they were not likely to be recorded in the annals. The diseases which were noticed there, were of a very different character, and belonged rather to another class of phenomena—those extraordinary sicknesses which, in obedience to a law hitherto undiscovered, visit the earth at different periods, prevail more or less extensively, and acting independently as it seems of any recognized causes of disease, are also beyond the reach of all known remedies."

Descriptions of M. Georgini of Lucca.

In many parts of Italy, as described by M. Georgini of Lucca, Marshes, even when close together, and consequently under the same climatorial circumstances, are not equally inimical to human health and human life. In certain parts also the vicinity of Marshes does not diminish the fertility or the population over which in other localities it exercises the most baneful powers. It was long ago conjectured, but not proved, that admixture of Sea-water with that of Marshes increased the malignity of exhalations issuing thence, and the problem would now appear to be solved by events which have taken place in Italy.

Between the Ligurian Apennines and the Mediterranean, lies a marshy tract of coast, about twelve Italian miles in length, and varying from two to four in breadth, traversed by several mountain streams or rather torrents, which are discharged into the Ocean, or into the Morasses bordering thereon. The marshy plain in question may be considered as an alluvion deposited by the rivers Arno and Serchio, and is bounded on the Sea line by a sort of embankment, only a few feet above the level of the Ocean. The waters collected by the rains, &c. are discharged from three basins into the Sea by natural or artificial Canals. The level of the stagnant waters is below high-water mark, and somewhat above the Ocean during ebb tide.

In consequence of this circumstance, and before any hydraulic works were constructed the flood tide changed the currents of the different exutories and caused them to run backwards into the morasses, mixed of course, with a proportion of Sea-water. While this was the state of things, the population of this wretched district was very scanty; and Viareggio,

now a large town, consisted of only a few huts. The natives, who were few in number, were constant victims to diseases of the liver and spleen, the children were sickly, and old men were no where to be seen. The unhealthiness of the place had, in fact, arisen to such a height, that the culture of the olive tree, with which this fertile tract abounded, was almost entirely abandoned to strangers, who of course fell annual victims to the Malaria of the Marshes. Various attempts were made to remedy the evil, and at length about the year 1741, a complete stop was put to it, by the construction of Valvular Gates, which permitted the efflux of the waters from the Marshes, but prevented any reflux of water from the Ocean. The effect was instantaneous and surprising. The insalubrity disappeared [when] these flood gates were completed, and only partially re-appeared when they were out of order, and permitted the admixture of Salt and Fresh water in the Marshes. Viareggio is now so salubrious as to be much frequented by the neighbouring wealthy inhabitants, as a place for sea-bathing, and enjoying the delightful sea breezes in the heat of summer. The population has rapidly increased, as a matter of course, since the happy change in the climate; and Viareggio, which in 1733 contained only 330 inhabitants, now shews a population of between 4000 and 5000.

On the account above given Dr. James Johnson observes, that, without doubt, this fortunate change was owing to the means above mentioned; nor can it be denied that the admixture of Salt and marshy water may have a deleterious influence in the production of Malaria; but it is also unquestionable, that the most deleterious exhalations issue from morasses which have no communication whatever with the Sea.

Dr. Wetherhead conceives that to the character of the soil (an important element in climate every where) in and about Rome, must be ascribed its peculiar insalubrity; for he states that it is permanently moist all the year round, a few inches under the surface.

The practical application of all that has here been urged, cannot be difficult; and I should hope that the singularly successful system of Draining, spoken of by Dr. William Fergusson as now existing in the level country of British Guiana, may be made applicable to the wants of our locality.

NATIVE HOSPITAL, J. R MARTIN.
Calcutta, June 10th, 1839.

No. 2.

DEAR SIR,

In continuation of my former Note on the subject of the Salt Water Lake, I beg to subjoin the following Memoranda, collected from the Statistical Reports on the sickness and mortality of the British troops in the Colonies, published by authority of Parliament.

Speaking of the climate of the Ionian Islands generally, the Statistical Report of 1839 contains as follows :—" It should be observed that within the last six years, a very great reduction has taken place in the mortality of the troops; indeed, during that period the average has been lower than in Malta or Gibraltar, and this improvement has extended to all the Islands of the Command. To what causes so marked a change in the character of the climate is attributable we profess not to decide; but can only state that, during this

period, great improvements have taken place in the Barrack and Hospital accommodation at several of the Stations; fewer soldiers have been employed in working on the roads; agriculture has made considerable progress in many Districts which formerly lay waste; and several of the Lakes and Marshes, formerly supposed injurious to health, have been drained and converted to available soil: all of which circumstances may have exerted considerable influence in this respect."

It is proper to state, in reference to the above quotation, that the authors of the Statistical Reports named, seem every where studious to avoid assigning any specific cause for the fevers, whether endemial of epidemic, which are found to prevail in the several British Colonies—and marshes, lakes, lagoons, salines, &c. are spoken of generally as "supposed" causes of disease.

Respecting the Island of Santa Maura, the authors, though remarking on the little certainty there exists regarding the real cause of remittent fever, and fully impressed with the difficulties of the subject, state nevertheless as follows:—"It will be observed that the prevalence of febrile diseases in this climate has of late undergone a very remarkable change: in 1832, for instance, there was no fatal case, and in 1835 but one, and not a twentieth part as many were attacked as formerly, yet the temperature was as high as in those years when fever most abounded. Within that time great improvements had taken place on the Lake, by increasing its depth, contracting its extent, and bringing a portion of the banks under cultivation, which may have had considerable influence on the health of the troops in its vicinity."

At Cephalonia, the troops became "remarkably healthy," after being removed from "the Southern extremity of the Town," (Argostoli) "nearest the marsh of Cutano," where also the barrack accommodation was defective. The high rate of mortality amongst the troops in Cephalonia (30.5 per thousand of strength annually) is distinctly ascribed by the authors "to the unhealthy locality in which they were quartered," and not "to the climate of Cephalonia, which, so far as regards the inhabitants at least, appears as healthy as any of the Ionian Islands; indeed, there is good reason to believe it is nearly as much so as Britain."

The Report then goes on to say, that the portion of the inhabitants who occupy "the highland districts, are said to possess a much more robust and healthy appearance than in the other Islands,—and though in the low grounds they occasionally suffer from remittent and intermittent fevers, those do not seem by any means of so fatal a character as among the troops. We find it recorded by Dr. Hennen, for instance, that in the epidemic of 1816, out of 12,000 of the inhabitants attacked, only 50 died throughout the Island, while, of 220 soldiers attacked, 80 died in the Town of Argostoli alone."

It is worthy of remark, again, that throughout the Ionian Islands two measures of prevention only are mentioned, namely, the deepening of Shallow Lakes, or else the reclaiming them for purposes of agriculture.

Throughout the entire Ionian command, fever is both the most fatal and prevalent disease, the rate of deaths to admissions into Hospital being very high in all the islands; and in the Island of Zante the deaths, in 1814, were 1 in 3, "being as large a proportion as by the worst description of yellow fever in the West Indies."

In the Island of Santa Moura the ratio of deaths by fever during twenty years has been higher even than in the Windward and Leeward command; in the proportion of 36 to 37, "and so general has been its prevalence, that 74.9 per thousand of the troops have

been attacked annually, while in the Windward and Leeward command the average proportion attacked, out of the same number of troops during that period, was 717."

Though the mortality throughout the Ionian Islands generally, is so much higher than either in Gibraltar or Malta, there is no corresponding increase in the proportion of constantly sick, and the same has been said of both the East and West Indies, where the diseases are mostly of a febrile character, and run rapidly to a termination.

The influence of Season in producing sickness and mortality in the Ionian Islands, is strikingly accordant with the results which on a former occasion I had the pleasure to bring to your notice in reference to the climate of Bengal, the period from July to November being strongly marked as productive of sickness and mortality. These last observations will not appear irrelevant, when it is considered that similar results of climate naturally point to similarity in preventive measures.

In Upper Canada, it is said in the Report that intermittent fever is comparatively rare, wherever the surface is covered with the dense forests ; even though the ground is wet and marshy. The vicinity of lands recently cleared are most subject to them, particularly meadows, or open patches of the forest, which though denuded of trees, have not been brought under cultivation ; it would appear too, that their prevalance is diminishing with the progress of agricultural improvement ; for since 1831, a period during which this province has been rapidly advancing in wealth and population, and many important changes have taken place in the vicinity of the stations occupied by the troops, intermittents have become comparatively rare, the proportion attacked having been scarcely one-tenth part so high as the average previous to that period. At page 156 of my Notes on the Medical Topography of Calcutta, will be found a very remarkable instance wherein a deadly station in the Island of Tobago had been rendered, by the simple measure of Draining a Marsh, "one of the healthiest quarters in the Windward and Leeward Island Station." The circumstances are stated at length by Dr. Robert Jackson, and the fact of improved health is grounded on "a comparative view of the Sick Returns of the Army."

In the Statistical Reports already referred to, many circumstances are stated in reference to various localities, and their influences, which would lead to converse opinions as to the causes of fever especially ; but in reference to the practical nature of the subject before us, and to the present state of our knowledge as to the causes of disease in general, it may prove more satisfactory to confine myself to the more commonly received opinions of medical men in all countries.

Yours very truly,
J. R. MARTIN.

BARRACKPORE,
August 28th, 1839.

No. 3.

(No. 528)

SIR, *Kidderpore Dockyard, 27th April, 1840.*

On the receipt of your letter, dated the 22d February, addressed to Rustomjee Cowasjee, Esquire, who transmitted it to myself, I was desirous of giving you immediately all the information you required ; not having however, the Records of the Tides for the years 1835-36 or 37, I sought for them, and I am sorry to say I have not yet obtained them. I therefore send you now the depths,* &c. for the years 1838-39, and should I subsequently procure the Records of the other years, I shall have much pleasure in sending you fuller information.

Highest high Water during the Freshes.

1838	4 Sept.	22 feet 10 inches.
1839	23 Sept.	23 feet 0 inches.

Highest low Water neap Tides during the Freshes.

1838	13 Sept.	12 feet 8 inches.
1839	17 Sept.	12 feet 4 inches.

Lowest high Water neap Tides, Dry Season.

1838	20 Feb.	9 feet 6 inches.
1839	9 Feb.	9 feet 2 inches.

Lowest low Water spring Tides Dry Season.

1838	26 Feb.	2 feet 1 inch.
1839	18 Feb.	2 feet 2 inches.

Yours faithfully,
ALEX. GORDON,
General Superintendent of Docks.

To J. MORRIS, ESQ.
Municipal Office, Town Hall.

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*NOTE—The above has been inserted on the Map marked No. 4 by the late Mr. J. Kyd—vide Appendix (G) opposite page 14.—J. M.

No. 4.

(No. 649.)

To THE HON'BLE. SIR J. P. GRANT.

1. Original letter from Major Taylor to the address of the late Mr. Thomas Hoseason, dated 27th, December 1834.
2. Copy of letter from the Committee appointed for the consideration of certain questions propounded by the Military Board to Captain Gabin Young, Secretary to the Board, dated 11th January 1834.
3. Estimate for Draining the Salt Water Lake by Captain Thomson, Engineers.
4. Original letter from the late Mr. James Prinsep to D. M'Farlan Esq. on the subject of the Silting of the Salt Water Lake.

Sir,

In reply to your reference of yesterday, I have the honor to forward to the Fever Hospital and Municipal Committee the Papers as per margin. The lamented Mr. James Prinsep's autograph to my address is valuable, might I request the return of the Papers when done with—I think they will afford a clue to trace other Documents.

I have the honor to be,
Sir,
Your most obedient servant,
D. M'FARLAN,
Chief Magistrate.

Calcutta, Police Office,
19*th November*, 1840.

No. 4. (a)

Estimate for Draining the Salt Water Lake by Capt. J. Thomson. Engineers, 1st. January, 1835.

Original Estimate.*

Embanking,	20,000
Draining,	32,000
Sluices,	82,000
Ditto,	14,000
Cuts,	12,000
Superintendence,	10,000
Interest,	30,000
Total	2,00,000
Purchase,	3,40,000
	5,40,000
Interest, at 5 per cent.	27,000
Repairs, &c.	10,000
Annual expense,	37,000
Income.	
30,000 Beegahs at 2 Rs.	60,000
Profit per annum,	23,000

*Vide Appendix (G) page 41 where an Estimate, dated 11th July 1834 by Capt. Thomson will be found.—J. M

NEW ESTIMATE.

Embanking, ...	37,000
Draining	9,000
Sluices, ...	17,500
Purchase,	
20,000 B. &c.	56,000
Superintendence, ...	5,000
Interest, ...	15,000
	1,39,500
Interest at 5 per cent.	7,000
Annual Repair, ...	10,000
	17,000
INCOME.	
7000 Bgs. at 2, ...	14,000
7000 Ditto, at 1, 4, ...	8,750
6000 Ditto, at 8 ans.	3,000
Fisheries, ...	1,500
	27,250
Profit per Annum	10,000

NO. 4. (B)

MY DEAR M'FARLAN.

There is nothing impossible in the Silting up of the Lake; and it must only be considered as a question of expense and expediency. The process is going forward *Apse-ap*—and in a mode not quite so rapid as is proposed by the Governor General, but attended with no danger or expense.

The Tarda Nala flood **b*. on entering the Lake spreads over the Lake through the small outlets *a. a. a.* where a deposit naturally takes place—this is increased by the fishermen's basket works and stakes, which retard the water on its return—bunds are soon formed, and vegetation raises the Level until it is fit for habitation and cultivation as *g. h.*—the channel itself being confined, by the bund thus formed on its sides, deepens, and thus a Canal is of itself formed, with dry land on either side. deeper and in a better direction than the proposed expensive cut at *e*. The Sunderbun water is not so clear in the

* Vide Maps opposite pages 38 and 47 of Appendix (G)- J M.

rains as has been supposed, and is capable of depositing a good deal each tide, though not so much as might be brought through a Feeder cut at *f.*—this Feeder, however, would be a very expensive thing, on account of the Ground to be purchased.

Have the *oldest Records of Government been searched to ascertain how much land was occupied towards Bahminghata, that the progress of deposit upwards may be reduced to calculation?—2nd, was there not a Lake on Tolly's Nala about midway; and has this been filled up by the flooding from the Hooghly? Let these two points be matters of examination before you form your opinion on such a momentous question.

The Estimate of the expense of cutting a Feeder in my brother's Note (printed in the July Gleanings 1830,) is much under the mark.

(*Signed*) J. P.

* Reference to Captain Claude Martin's Survey in 1760 of the Calcutta Lands or 24-Pergunnahs, which is lodged in the Surveyor General's Office, will throw some light on the above Question.—J. M.

No. 5.

My dear Gordon,

Schalch's Levels of the Town were not (as far as I could understand those in the Lottery Committee's Office) referred to a standard†—when Capt. S. referred to a Gauge it generally was the Koolya Bridge Gauge—the Zero of which was 6 feet 5½ inches of Prinsep's Gauge. I make you a present of some lithograph levels, which are tolerably accurate—you will see there, that there was in September 1823 a tide that did not fall below 11 of Prinsep's Gauge. The average of the highest *Low water marks* is 3 feet, or 5 feet below the lowest part of Calcutta.

Yours truly,
J. THOMSON.

† Note.—Major Schalch reckoned his base line as answering to 11 feet 10 inches, of Kyd's Gauge. Vide Appendix to Appendix (G) page xxv.—J. M.

No. 6.

List of the Routes, Canal and River Surveys, Maps, Plans, and Land Surveys, lodged in the various Offices of the Bengal Presidency, which the Municipal Committee think might be referred to with advantage on the occasion of any Inquiry connected with the City of Calcutta and its Environs, &c.—J. M.

ROUTES.

No.	Military Board Office.	Title of Maps	Author's Name	Original or Copy.	Scale.	Date.	Remarks.
1	110	Sketch of the road from Calcutta to Jessore, ...	Captain J. A. Crommelin, ...	....	Miles Inch, 1—1	1831	In good condition.
2	115	Sketch of the road from Calcutta to Kishnagur, 61 Miles.	Ditto, ...	....	1—1	1834	Ditto.

CANAL AND RIVER SURVEYS.

No.	Surveyor General's Office.	Title of Maps	Author's Name	Original or Copy.	Scale.	Date.	Remarks.
1	Vol IV N° 7	Map illustrative of the Rivers, Canals, and Water communication of the Lower Provinces of Bengal and Bahar, (unfinished,)	Constructed in the Surveyor General's Office by order of Colonel Colin Mackenzie, Surveyor General of India, ...	Compilation.	* 12—1	....	Lat and Long. Lines drawn. In good order.
2	31	Sketch of the Hooghly River from Calcutta to Kedgeree, ...	Compiled in the Surveyor General's Office, ...	Red. Copy.	2—1	1830, 17 Mar.	Lat. and Long. Lines drawn.
3	Q. 1	A Survey of part of the Soonderbuns, made during the three seasons of 1811-12-13-14, by Lieutenant W. E. Morrieson, oriented or corrected by Astronomical observations, to which is added Captain Hugh Morrieson's continuation of the Soonderbuns' Survey in 1818, ..	Lieutenant W. E. Morrieson, Engineers and Captain Hugh Morrieson, D. A. Q. M. G. ..	Copy, ...	2—1	1811—14 and 1818	A large Map in good order. Lat. and Long. lines drawn. Long. referred to the Meridian of Calcutta, Fort William.
4	6	Survey of the Soonderbuns, in 8 sheets, ...	By Capt. T. Robertson,	Copy, ...	1—1	1803	In good order,
5	11	A Map of the Soonderbuns, extending from the Hooghly to the Megna River, with an enlarged copy of its Eastern Portion, forming a plan of the Islands at the mouth of the Megna River,	Anonymous, but supposed to be surveyed by Rennell, Ritchie, or Martin, between 1760 and 1780, ...	Copy, ...	5—1 Enlarged Copy, 1875 Br. Miles 1.	1770	Lat. and long. lines drawn in pencil, the latter referred to the Meridian of Fort William, enlarged Copy unfinished.
6	18	Surveys of the Salt Lakes and Marshes adjoining Calcutta shewing the connection with the different Canals and Tide Creeks, ...	Captain T. Prinsep,	Copy, ...	½ 1	1828, Dec.	In good order.
7	S. 41	Table shewing the High and Low water of the Hooghly at Calcutta in spring and neap tides, ...	....	Original and Copy,	....	1806—7	In good condition
8	Vol. III. Comp. III. 56	McCarthy's Survey of Watson's Docks in the Hooghly River, in 2 sheets, unfinished with a lithographic plan on a reduced scale, .. * A Lithograph Copy of this Map is inserted opposite page 6 of Appendix G.—J. M	....	Original and Lithographic Copy,	Feet In. 150—1	....	In good order, but old.

CANAL AND RIVER SURVEYS.

No.	Surveyor General's Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
9	Vol III. Comp. IV. 4	Lithographic Map of the Rivers Ganges, Bhagirutty & Hooghly, in 8 sheets, from Allahabad to Calcutta, corrected from the old Surveys of Major R H. Colebrooke, dated 1801, J S. May and Captain Fitzgerald, exhibiting their present appearance in September and October, 1828, ...	Capt. Thos. Prinsep, Engineers, ...	Lithograph,	Miles In 2—1	October, 1828.	In excellent condition, received 31st July 1829
10	Vol. III. Comp. V. 35	Survey of the River and Country on the Western Bank of the Hooghly, from Sangrall Point to Budge-Budge, ...	Captain Mark Wood, Engineers, ...	....	Furlongs In. 1 1	1780—81	In pretty good order. Large Map.
11	35½	A Survey of the West side of the Hooghly River, from the mouth of the Dummodah River to Fort William, ...	....	....	Br. Miles, In. 1¼—1	1777,	In pretty good order
12	36	A Ditto of the East side of the Hooghly River, from Fultha to Chingry Creek, ..	....	....	0¾—1	1777,	Ditto.
13	39	Survey of the Rivers Choornee, Howleah, Coomer and Issamutty &c to ascertain the practicability of opening a new and more direct Passage to the Ganges through Tolly's Nullah and the Soonderbuns,..	R H. Colebrooke, Surveyor General,	3 Copies, ..	Br. Miles In 2—1	1795, February, April, and May.	In good order. 1 Copy Pasted on cloth
14	40	Map of the Survey of the Cossimbazar and Issamutty Rivers and part of the Ganges,	Major R H Colebrooke, ...	2 Copies, ..	4—1	1796,	In good order
15	[illegible]	Plan exhibiting the Soonderbun Passage from the mouth of Tolly's Nullah to Hitchindia and Chouragundpore on the Jaboona River, No 1.	R. H. Colebrooke, Surveyor General,	Ditto, ...	1—1	1795,	Ditto
16	43	Survey of the Issamutty River, Chouragundpoor to Noonagunge, ...	Ditto, ...	1 Ditto, ...	1—1	....	Ditto
17	44	Survey of the Choornee and Issamutty Rivers, the Jaboona Creek and part of the Hooghly River, ...	....	....	1—1	....	Torn or rather destroyed near the title by cockroaches.
18	45	Survey of the Choornee and part of the Issamutty Rivers from Hurrerapoor to Faldahy, ...	....	....	0½—1	1810,	Nearly the whole of this plan is contained in the preceding Map, No. 44
19	46	A Survey of Soonderbun Passage from Balliaghaut on the Salt Lake to Sutaloor,..	....	....	....	....	In good order.
20	47	Map of the Kachecutta and and Koomar Rivers, ...	....	....	1—1	1810,	Ditto
21	48	An accurate Plan of the River Hooghly from Kidderpore or Tolly's Nullah to Chitpoor, with soundings,	J. McCarthy, ...	Original,	Fur feet, In. ¼ or 330—1	....	In good order
22	49	Survey of Tolly's Canal, in 2 sheets, ...	Lieutenant T. T. Blunt, Engineers,	Ditto, ...	Yds. 200—1	....	Ditto

CANAL AND RIVER SURVEYS.

No.	Surveyor General's Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
23	50	Plan of the Jaboona Creek (between the Issamutty and Hooghly Rivers,)	....	....	Br. Miles, In 2—1	....	Ditto.
..	73	Map of the Ishamati River between Pabna on the Ganges and Harrisagar, ..	Captain Richard Wilcox B. N. I. ..	Copy.	1—1	1830-31	Ditto.
	Chief Engineer's Office.						
24	32	A plan of Diamond Harbour, shewing the disposition of the Moorings together with the buildings erected for the accommodation of the Officers and crews of the Hon'ble E. I. Company's Europe ships, ...	James Caldwell, Lieutenant of Engineers, ...	....	Feet In. 50—1	January, 1789,	In good condition, except injured by worms a little at one end.
25	77	An old torn Survey of the River Hooghly with the several settlements without names, ...	....	....	Mile Inches. 1—2 7/10	....	Much torn, and in bad condition.
26	132	Survey of Tolly's Nullah, commencing from the Hooghly River S. W. of Fort William to the Salt Golah near Teugurryah, with 15 Sections, shewing the breadth and depth of the Nullah at different places, also the rise of the water at neap and spring tides in June, 1796, ...	....	....	....	....	In good condition.
27	176	Survey of the Salt Lakes or Marshes adjoining Calcutta, shewing the connection with the different Canals and Tide Creeks, copied from the original, by T. Prinsep, Captain, Engineers, 1828, also exhibiting the method of settling the Lake by compartments proposed by the Chief Engineer, ...	Colonel Sir Thos. Anbury, K. C. B. ..	....	Fur.—In. 1—¼	Nov. 1833.	Ditto.—See Appendix G opposite p. 6, where a Copy of this Map is inserted. J. M.
28	177	Sections of Levels to accompany the Chief Engineer's Memoir on the subject of draining the Salt Water Lakes, ...	....	....	Feet—In. 100—1	....	Ditto.—See App. G opposite p. 36, where a Copy of this Map is inserted. J. M.
29	178	Another ditto ditto, ..	....	....	....	....	Ditto, ditto.
30	179	Plan of the Salt Water Lakes near Calcutta,..	Copied from the Original by J. Thomson, Captain, Engineers, Superintendent of Canals, ...	....	M.—In. 1—3½	....	Ditto.—See App. G opposite p. 38, where a Copy of this Map is inserted. J. M.
31	181	Survey of Tolly's and Putoory Nullahs, from the mouth of the former to Kamapookrea on the latter, ..	T. W. Taylor, ditto, ditto, ditto, ..	....	400—1	January, 1827.	In good condition.

CANAL AND RIVER SURVEYS.

No	Military Board. Office	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
32	....	Map explanatory of a plan for opening a communication between Calcutta, Diamond Harbour and the New Anchorage, by means of a Canal proposed to be cut from the Puttoory Nullah to the Bhortullah Khall, ..	Capt. T. M. Taylor,	Copy,	Feet Inch. 1—1	1824.	In good condition. —Ordered to be executed, see para. 87 to 91 of a Despatch from the Hon'ble. Court of Directors dated 11 July 1827. J. M
33	....	Surveys of Tolly's and the Puttoory Nullahs, ...	Ditto,	Original,	600—1	Ditto.	Ditto
34	....	Survey with Sections of the Creek between Diamond Harbour and Oastee, ..	Ditto,	Ditto,	Ditto ditto,	Ditto.	Ditto.
35	....	Surveys of Tolly's and the Puttoory Nullahs from the mouth of the former to Khamapookreea, ...	Ditto,	Ditto,	700—1	Ditto.	Ditto.
36	....	Survey of the Chingry Creek, ...	Ditto,	Ditto,	600—1	Ditto.	Ditto.
37	....	Survey of the Eastern Bank of the River Hooghly, from the Chingry Creek to Rangafulla, ...	Ditto,	Ditto,	1200—1	Ditto.	Ditto
38	....	Map of the proposed new Navigation from Koolna to Calcutta, shewing the plan of the Canals and the present passage of the Soonderbuns, ...	Captain Schalch,	Ditto,	Mile. Inch. 1—1	1821.	Ditto.—See Appendix to Appendix G opposite p. vi, where a Copy of this Map is inserted. J. M.
39	....	Maps of such parts of the Rivers Gurroy, Komar, Barrasee and Moodoomutee, as form the Navigation between the Ganges and the Soonderbund passage, together with Uttaree Banka & Mowdew Nullahs, ...	Captain Schalch,..	Original,..	2—1	1821	Ditto.
40	16	Survey of the Hoseenabad and Ballygunge Canal, ...	Lieutenant Thomas Prinsep,....	Ditto.	Fur. Inch. 1—1	....	Ditto.
41	24	Survey along the course of the Bungur Khall, ...	Ditto,	Ditto.	Mile, Inch. 1—1	....	Ditto.
42	25	Survey of the Eastern Canal exhibiting the various properties which adjoin the Road on its Banks.	Captain Prinsep, and drawn by Mr. Turner, ...	Ditto,	Feet Inch. 125—1	1827	Ditto.
43	26	Sketch of the Chultabarrya Tide Canal, ...	Captain Prinsep,..	Ditto.	100—1	....	Ditto.
44	28	Survey of the Line of country between Chultabarrya Canal and Bhamunghatta, with the proposed New Canal, ...	....	Ditto.	Mile, Inch. 1—1	....	Ditto.
45	29	Survey of the course cleared in 1827, for the excavation of the Canal at Bhowanypore, uniting the Hoseinabad Cuts and Gobra Khall, with the Hinshee Khall, ..	....	Ditto.	Feet Inch. 1400—1	....	Ditto.

CANAL AND RIVER SURVEYS.

No	Military Board Office	Title of Maps.	Author's Name	Original or Copy.	Scale	Date.	Remarks.
46	31	Plan and Section of the Line of Canal between Chultabarrya and Bhamunghatta as excavated in 1827-28, ...	....	Original, ..	Mile Inch. 1—4	....	....
47	38	Outline Plan of the Series of Canals between the Hooghly and Issamutty Rivers	....	Ditto	1—2	1829	In good condition.—See Appendix G opposite p. 6, where a reduced Copy of this Map is annexed to Capt Prinsep's Map of the Suburbs of Calcutta. J M.
48	39	Sketch of the Bhamunghatta Canal, as executed in 1828-29, ...	....	Ditto	1—6	1829	....
	Superintending Engineer's, Lower Provinces, Office						
49	14	Survey of the Beel Bulie, a large Jheel in the District of Jessore, ...	Captain Crommelin, Engineers, ...	Ditto	1—1	1834 March	....
	Secretary to Government Revenue Department						
50	2	Survey of the Issamutty and Howleeah Rivers, ...	By Lieutenant R Wroughton, ...	....	1—2	....	When commenced on and finished, not known
	Secretary to Government, General Dept. Office						
51	11	A MS Sketch of the large Dock at Howrah built.	By the late Mr. Jones [by Sepping]	....	Feet Inch 8—1	....	In good order
52	3	Levels carried from the Bank of the Hooghly River in different parts of the Town of Calcutta towards the Mahratta Ditch and Salt Water Lake, ...	....	....	....	1783-84,	Lent to the Marine Board, and said to be lost —J. M.
53	12	Map of Jabuna Creek, ...	....	...	Br. Miles In. 1—1¼	1820	In good order.
54	23	Survey of the Cossimbazar River and part of the Ganges,	By R. H. Colebrooke, Surveyor General, ...	....	1—1	1796,	Rotten, torn.
55	36	Survey of the River Choornee, Howleah, Coomar and Issamutty, ...	By R. H. Colebrooke, Surveyor General, ...	....	2—1	1795,	In good order.

CANAL AND RIVER SURVEYS.

No.	Secretary to Govt. General Dept. Office late Chief Secretary's Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
56	43	Survey of the Issamutty River, &c.	By R. H. Colebrooke, Surveyor General, ...	....	1—1	....	In good order.
57	44	Survey of the bank and soundings of the River from Calcutta to the Boundary Esplanade, ...	By Ensign John Gordon, ...	....	....	....	In pretty good order.
58	51	Survey of the Choornee or Hurdum River, ...	By R. H. Colebrooke,	....	....	....	Ditto.
59	84	Survey of the Bank and soundings of the River from Calcutta to the Boundary of the Esplanade, ...	By Captain F. H. Pearson, ...	....	....	....	....
	Office of Board of Customs Salt and Opium &c. Marine Board.						
60	28	A Sketch of the Inland Navigation of Lacam's Channel, or rather a portion of the Inland Navigation from the head of Channel Creek, ...	Not mentioned,	....	....	None,	....
61	B. 5	Charts of, and Remarks on, the River Hooghly, ...	P. G. Sinclair,	Original,	Miles, In. 1—2	1827,	A Book of little value.
62	6	Plan of the Hooghly River from Kidderpore to Chitpore House, ...	J. McCarthy,	Ditto,	Ft. In. 300—1	No date,	Manuscript.
63	7	A Plan of Calcutta Reach,	Lloyd, ...	Ditto,	300—1½	1835,	....
64	10	Plan of the Eastern bank and Channel of the River from Old Fort Ghaut to Abbott's Wall, ...	Not mentioned, ..	Ditto,	100—2½	1797,	These two Charts are connected with each other, and together shew how far the bank within its Boundaries has encroached upon the River.
65	11	Views of the Shelving of the bank taken at four places between Old Fort Ghaut and Abbott's Wall, ...	Not stated, ...	Original,	10—1	1797,	....
66	24	Chart of Saugor Island comprehending Channel Creek from Edmonstone's Island to Frederick Point, the Eastern and Thornhill Channels, ...	Marine Surveyor and Assistants, ...	Ditto,	Mile Inch, 1—1¼	1816—17,	....
67	7	Sketch of Lacam's and the Eastern Channels, ...	R. Lloyd, J. N.	Ditto,	10—Long 4½	1837,	Lithograph,
68	8	Draft of Lacam's Channel,	Mr. Sinclair, B. P.	Ditto,	None,	1827,	Ditto.
69	9	Survey of Lacam's Channel to the Lower part of Earl Moira's Harbour, .. .	Maxfield, ...	Ditto,	....	None,	....
70	11	Plan of Thornhill's Channel,	Under direction of the Master Attendant, ...	Ditto,	....	1807,	....

MAPS, PLANS, AND LAND SURVEYS.

No.	Surveyor General's Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
	Vol. IV. A						
1	24	Captain Fleming's Survey in the Vicinity of Calcutta.	Captain Fleming.	Original Copy and Reduction.	Br. Ml. Inch, Red. 4/1 —1	1801.	With rough Drafts on half foolscap sheets.
2	26	Calcutta Lands or 24-Pergunnahs...	Captain Claude Martin.	Original and 2 old Copies and 1 new Ditto.	M. 1—1	about 1760.	Original, pasted on cloth, completely destroyed by age.
	M						
3	4	Part of the General Survey of the Calcutta Lands (or 24-Pergunnahs.)	Captain Claude Martin.	Original and 2 fair Copies.	1—1	about 1760.	The Original is in bad condition, Paper having become rotten. A Meridian Line is given.
4	9	Plan of the Company's Lands and Lakes.	By Captain Cameron.	Copy.	About 1¼—1	....	A Meridian Line given.
5	12	Map of the Country from 30 to 40 Miles round Calcutta, compiled from Materials in the Surveyor General's Office, for the use of the Superintendent of Police.	By R. H. Colebrooke, Surveyor General.	Copy and Reduction.	Copy 2 Red. 4 —1	1800.	In good order Lat. and Long. Lines drawn.
6	25	Topographical Sketch of the Jessore District.	Compiled in the Surveyor General's Office, 18th January, 1826...	Copy.	4—1	1826, 18th January.	Lat. and Long. Lines drawn.
7	30	Geographical Sketch of the District of Hooghly.	Compiled in the Surveyor General's Office.	Original compilation and 3 Copies.	4—1	1824, October.	Lat. and Long. Lines drawn.
8	32	Sketch Map, or Chart, exhibiting in detail the Tract of Country Surveyed under the Bengal Presidency.....	Ditto.	Compilation.	64—1	1831, 31st December.	Graduated for Lat. and Long.
9	35	Plan of the Tract of Country comprehended between the Issamutty River on the East, and the Towns of Bungon, Hobra, and Bagundee to the North West and South, and situated in the Districts of Nuddeoa and Barraset, shewing the Indigo Factories.	No name; Copied in the Surveyor General's Office from the Original Plan, returned to Mr. J. Thomson, Deputy Secretary to Government Revenue and Judicial Department.	Copy.	1¼—1	Copied 9th May, 1832.	In good order. No Meridian Line given.
10	40	Map of the Provinces of Kishenagur, Jessore, Boosnah, and Mohmudshi, with part of Dacca and Raujeshye, comprehending the habitable part of the Tract of Country situated between the arms of the Ganges. ..	Surveyed by Rennell, Martin, and Richards.	2 Copies.	5—1	1764 to 1772.	One Copy, pasted on cloth, and very old, the other in better order, not on cloth.
11	43	Map of the Country situated between the arms of the Ganges, comprising the districts of Nuddea, Jessore, Backergunge, part of Jelapoor, and of the 24-Pergunnahs, including the Joint Magistracy of Barraset.	Compiled in the Office of the Surveyor General of India, from the Maps by Rennell, Martin and Richards, dated 1764-73. The Boundaries of the Districts taken from a Map of the Police Thanahs in the Lower Provinces, dated 1824.	Compilation Original.	5—1	1836, 19th April, Calcutta.	Lat. and Long. Lines drawn.

MAPS, PLANS, AND LAND SURVEYS.

No.	Surveyor General's Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
12	S. 1	A Map of the Suburbs of Calcutta between Barnagore, the Salt Water Lake and Garden Reach, laid down from four Sketches, furnished by Captain F. S. White, Surveyor, with additions and corrections. ..	By Lieut. R. C. Faithfull, Surveyor, Suburbs of Calcutta.	....	Yards, Inch. 300—1	1817, 11th November.	In good order. A larger Map.
13	2	Map of Cassepore, Barnagore, Paulparrah, Nouparrah, Dunnyraut, Nynun, Seetee Ooturparrah, and part of Bun-Hooghly, Joypore Beerparrah, Chitpore, and Pauckparrah, shewing all the Roads, Lanes, Tanks Ditches, Houses, and Huts, also Police and Custom Thannahs.	Laid down from actual Survey, by Major H. Faithfull and Captain R. C. Faithfull.	Copy.	100—1	1818, 18th December.	Pasted on cloth and edged with black ribbon. It was in very bad condition and half destroyed; in this state it was found by Mr. James Prinsep, Assay Master, Mint, and sent by him for deposit into this Office.
14	4	Survey of part of the Suburbs of Calcutta, commencing at Intally, taken in May and June 1813.	By J. F. Hyde, Lieutenant and Surveyor.	Fair Ditto.	Feet, Inch. 90—1	1813, May and June.	In good order.
15	5	Plan of Budge-Budge and the River Hooghly in 2 sheets.	By Lieut. Parrott.	Apparently Original.	400—1	1772.	In tolerable condition but paper decaying.
16	S. 7	Pencil Sketch of the Suburbs of Calcutta, (Ballygunge to Garden Reach.)	....	....	....	....	A middling size Plan.
17	8	Map of Calcutta and its Environs, from an accurate Survey taken in the years 1792, and 1793.	A. Upjohn.	Engraved Copy.	Fur. Inch. 1—1	1792-93.	Pasted on cloth, in pretty good order.
18	10	Pencil Plan of Garden Reach.	....	....	Feet, Inch. 300—1	....	In good condition.
19	12	Survey of the ground to the Southward of Chowringhee and the General Hospital, including the whole of Bhawanipoor.	Ensign Blunt, Engineers.	Original.	200—1	1796, Nov. and Dec.	A Meridian Line drawn, in tolerable order.
20	14	Plan of the Hon'ble. Company's Botanic Garden.	W. Scott, Assistant Surveyor.	Copy	200—1	1819.	In good order.
21	15	A Sketch of the Roads in the Suburbs of Calcutta from Garden Reach to Chitpore, in 4 sheets.	Lieutenant F. S. White, Surveyor.	Original.	Mile, Inch. 1—6	1815, Jan.	Ditto ditto, Vide S.I. Reg. No. 54.
22	20	Topographical Survey of Calcutta, (unfinished.)	By the Surveying Apprentices, under the orders of Major Hodgson, Surveyor General of India.	Ditto.	....	1822.	In good order.
23	38	Plan and the Survey of the Country between Budge-Budge and the Hooghly River, with an unfinished Plan of Survey of the Country South of Allypore and Kidderpore 2 sheets A. & B.	Lieut. E. Robinson, Engineers.	Copy.	F. Inch. Plan 1—1 Unf. do. 2—1	1780.	In good order sheets S. 38(a) is a continuation of and joins to Map S. 24, Vide Reg. No. 56.
24	46	Tables of Calcutta Levels, with an unfinished Plan of a Survey of a piece of ground and also a Plan of some Salt Lands.	....	....	....	....	In good order.

MAPS, PLANS, AND LAND SURVEYS.

No.	Chief Engineer's Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
25	13	Plan of Fort William and the City of Calcutta, with the Country round it, laid down from a variety of Surveys in 1786.	T. Call, Chief Engineers.	Ditto.	1—2	1786.	
26	62	An old Survey of Calcutta...	....	Ditto.			
27	63	Part of the General Survey of the Calcutta Lands.	....	Ditto.	Mile, Inch. 1—1		
28	131	Plan of the Honorable Company's Botanic Garden, situated on the North bank of the Hooghly River, 4 Miles West of Calcutta, containing an area of 13,40,388, Square Feet or 307 Acres, 2 Roods, 33 Poles 138 Square Feet or 930 Beegahs, 16 Cottahs, 302 Square Feet, laid down from an actual Survey in Jan 1819.	....	Ditto.	Feet, Inch. 200—1	January, 1819.	
29	140	Sketch of the Country between Oolabareah and Panchkowry Ghaut, with a proposed line for the new Road and Canal.	....	Ditto.			
30	142	Sketch of the Road across the Budge-Budge Nullah, and a Plan and Section of the new Drain.	....	Ditto.			
31	143	Survey of the country between Budge-Budge and Adjepore, shewing the general direction of the continuation of the Budge-Budge Road to Adjepore.	....	Ditto.	Feet, Inch. 1200—1		
32	151	Survey of the new line of Road from Budge-Budge to Paunchkoorah Ghaut.	W. R. Fitzgerald, Engineers.	Copy.	Fur. Inch. 8—1	1829.	In good order.
33	208	Plan of the new Grounds at Deegla, lately taken into the Cantonments at Dum-Dum, Exhibiting the site for the new Stables, the low Ground requiring to be levelled and dressed, also the Tanks, Jeels, &c. to be filled up.	....	Original.	100—$1\frac{3}{10}$	....	Rough Plan.
34	214	Plan of the Boundaries of Dum-Dum, Copied from a Plan in the Military Board's Office from a Survey by. ..	Lieut. Malloch, Engineers.	Original.	Yards, Inch. 100—$6\frac{3}{10}$	August 1833.	Rough Plan.
35	225	Plan of the Cantonments at Ballygunge.	W. M. Smyth, Lieut. Engineers...	Ditto.	100—1	April, 1833.	
36	226	Plan of the Cantonments at Allypore.	Ditto, ditto.	Ditto.	100—$1\frac{2\frac{1}{2}}{10}$	....	Ditto.
37	284	A Sketch of Saugor and its Environs from recollection	G. Wilton, Ensign, Engineers. ..	Copy.	Mile, Inch. 1—2	....	In good condition.
	Military Board Office.						
38	....	Survey of the Road, Ditch and Nullah, between Oostee and Hottogunge. ..	Captain T. M. Taylor.	Original.	Feet, Inch. 600—1	1836, July.	In good condition.

MAPS, PLANS, AND LAND SURVEYS.

No.	Military Board Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
39	....	Survey and Levelling section of the Country between Kamapookreeah and Oostee.	Ditto.	Ditto.	1200—1	Ditto.	Ditto
40	....	Survey and Levelling section along the ridge of ground which crosses the line of the Diamond Harbour Canal at Gourypore...	Ditto.	Ditto.	Do. Do.	Ditto.	Ditto.
41	4	Map of the City of Calcutta, with part of the Suburbs and adjacent Country lying to the Eastward.	Captain Schalch.	Ditto.	Fur. Inch. 2¼—1	1821.	Ditto.
	Quarter Master General's Office						
42	115	Map of Calcutta.	....	Copy.	Mile. Inch 1—3¼	....	Good.
43	44	Plan of Davidson's Survey of Dum-Dum and Cossipore.	Thomas Hardwick.	Copy.	5—1	1815.	Indifferent.
44	188	Plan of the School ground at Kidderpore.	....	Original.	Feet. Inch. 100—1	1817.	Ditto
	Superintending Engineer lower Provinces Office.						
45	8	Survey of the Bunds between Diamond Harbour and Calcutta.	Mr. Rowe Assistant to Captain Fitzgerald, Engineers.	Copy.	Feet, Inch. 2000—1		
46	11	Survey of the Embankments in the 24-Pergunnahs.	Ditto.	....	1—1		
47	29	Plan of the Cantonments and Park at Barrackpore	Ensign Kewney, Deputy Assistant Quarter Master General.	Copy.	250—1	1835, June.	
48	20	Plan of the Artillery Cantonments at Dum-Dum.....	Ditto, ditto.	Ditto.	250—1	1835, 1st Sept.	
	Secretary to Government Bengal Judicial Department.						
49	3	Map of Jungle Mehals.	Unknown.	Copy.	Mile, Inch. 5—1		
50	4	Map of Jessore.	Ditto.	Ditto.	Ditto.		
49	5	Map of Nuddeah.	Ditto.	Ditto.			
50	22	A Sketch of the Districts of Nuddeah, Jessore, and the 24-Pergunnahs. ...	Ditto.	Ditto.	10—1		
51	34	Sketch of Jessore, Soonderbuns, and the 24-Pergunnahs.	Ditto.	Ditto.	2—1	1817.	

MAPS, PLANS, AND LAND SURVEYS.

No.	Secretary to Government Bengal, Judicial Department.	Title of Maps.	Author's Name.	Original or Copy.	Scale	Date.	Remarks.
52	57	Map of the Soonderbuns, compiled from the latest Government Documents, and shewing accurately the Boundaries of the Forest, the recent Grants of Land and those of 1780, together with 128 additional allotments of Jungle Land, also a Skeleton Map of the Country adjacent to the Soonderbuns, and comprising the 24-Pergunnahs with Calcutta and its Environs, and part of the Kishnagur, Jessore, and Backergunge Districts.	By Lieutenant A. Hodges, 29th Regiment Bengal Native Infantry, and W. Dampier, Esquire.	....	Mile, Inch. 2—1	1831	Printed and published by permission by T. Black, at the Asiatic Lithographic Press, Calcutta.
53	63	Survey of part of the Soonderbuns	By Lieutenant W. C. Morrieson.	....	4—1	1811-12-13-14.	
54	65	A Survey of Military Cantonments at Ballygunge. ..	By J. Gordon, Lieut. Engineers.	....	Yards, Inch. 100—1		
	Secretary to Government Bengal, Revenue Department.						
55	9	Plan of the Northern part of Saugor Island, extending to the new Anchorage.	....	Copy.	1—2	....	Copied from Lieut. Blane's Survey received with Sudder Board's letter, 23rd March 1830.
56	15	Map of Saugor Island.	By Mr. Harris, H. C. M.	....	2—1	....	Received with Sudder Board's letter 23rd Mar. 1830.
57	25	Map of Kidderpore.	Unknown.	....	100—1		
58	26	Survey of parts of the Suburbs of Calcutta, commencing at Entally.	By Lieut. J. F. Hyde.	....	100—1	May and June, 1813.	In 3 Sheets.
59	31	Sketch exhibiting the Eastern Salt Chowkies.	Unknown.	....	Mile, Inch. 8—1		
60	38	Map of the Soonderbuns and the Environs of Calcutta, comprising the 24-Pergunnahs and Hooghly District, with part of Jessore and Nuddeah.	By Capt. T. Prinsep	....	4—1	1830.	Lithographed. See Appendix G. to Municipal Committee's Report opposite page 6, where a Copy of this Map is annexed.—J. M.
61	42	Plan of the City and Environs of Calcutta.	Constructed chiefly from Major Schalch's and Captain Prinsep's Surveys of the Suburbs, with the latest Improvements.	....	2¼—1	....	Drawn and Lithographed by J. B. Tassin, 1832.

MAPS, PLANS, AND LAND SURVEYS.

No.	Secretary to Government, General Department's Office.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
62	31	The Suburbs of Calcutta, in 6 parts, 1 Map.	By Capt. T. Prinsep.	....	Mile, Inch. 4—1	1830.	In pretty good order.—See Appendix. G. to Municipal Committee's Report opposite p. 6 where a Copy of this Map is annexed.—J. M.
63	58	Sketch of the vacant ground in Cornwallis-Square.	By Burn and Co. on Reverend J. C. Illes' reference.	....	Feet, Inch. 30—1	....	In good order.
64	60	A Plan of Tank-Square and the Public Library.....	....	....	100—1	....	Ditto.
65	61	Plan of Mr. D. Hare's property and the Bankshall premises.	....	....	30—1	....	Rough and injured.
66	83	A Map of the City and Environs of Calcutta.	By J. B. Tassin.	....	700—1	....	Framed and glazed, in good order
	Secretary to Government, General Department's late Chief Secretary's Office.						
67	5	Sketch of ground purchased from the Nabob of Moorshedabad.	By Lieut. C. Paton.	....	Feet, Inch. 35—1	....	Old and damaged.
68	6	Section of the Bank at the Old Fort Ghaut.	By Capt. Pearson.				
69	14	Table of Levels for the Town of Calcutta, taken by order of the Marquis Wellesley, K. P. Governor General and Captain General, &c. &c. &c. in the year 1804-5.	By James Robertson, Lieutenant, Engineers.	....	....	1804-5	See App. I. to Municipal Committee's Report opposite page — where a Copy of this Map is annexed. J. M.
70	18	Plan of the Great Circular Road.	....	....	....	....	In several sheets, a little moth-eaten.
71	19	A proposed Scheme for sub-dividing the Grounds bounded by the Calcutta great Streets.	....	....	200—1	....	Very old and torn. Pertaining to the Paper printed in the Addenda to Appendix. F. to Municipal Committee's Report, See page 308, paragraph 7.
72	38	Plan of part of the Burrah Bazar.	H. Osborn.	....	70—1	1819.	In good order
73	40	Rough Sketch of the Town of Calcutta.	By Capt. Collins.	....	20—1	....	In pretty good order.
74	46	Plan of Calcutta Roads, &c. &c.	....	....	....	....	In several rolls, in pretty good order.
75	79	Map of Calcutta and its Environs, from an accurate Survey.	A. Upjohn.	3 Copies.	....	1792-93.	In good order.
76	91	Rough Plan of the Ground round the Government House.	By Captain Wyatt, Engineers.	....	30—1	....	Torn, and in bad condition.

MAPS, PLANS, AND LAND SURVEYS.

No.	Secretary to Government, Political Department.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
77	115	A rough Sketch of the Chowringhee Roads, &c. ..	....	....	Feet, Inch. 140—1	....	Torn and injured.
78	116	A Plan of different Buildings and Houses at Bow Bazar and other adjacent Streets.	General Garstin. ..	....	70—1	1813.	Mounted on cloth, and in pretty good order.
79	120	A Sketch of Chitpore Road, &c.	Lieutenant Paton.	....	....	1820.	In pretty good order.
80	119	Map of Calcutta.	Major Schalch.	....	....	1820.	
81	..	Koolna and Calcutta.					
82	..	Map of the Soonderbuns. ..	....	....	Mile, Inch. ½—1	1833-34-35.	
	Magistrate's Office, 24-Pergunnahs.						
83	1	Calcutta and its Environs...	J. A. Schalch, Major, Superintendent of Canals and Bridges. ..	Original. ..	....	1825.	In good order
84	3	Map of the Country, from 30 to 40 miles round Calcutta, including the Company's Lands or the 24-Pergunnahs.	Asiatic Lithographic Company's Press.	Copy.	....	....	In bad order.
85	5	Map of the 7 Southern Thannas of the 24-Pergunnahs.	Abdool Rubine, Draftsman.	Ditto.	....	....	Ditto.
86	7	Dum-Dum Cantonments.	Lieut. Mallock, Engineers.	Ditto.	1900 Yards.	August 1833.	Ditto.
	District 24-Pergunnahs, Civil Judge's Court.						
87	1	Map of 24-Pergunnahs, 30 to 40 miles round Calcutta.	No name.	Not known, but it is in Manuscript	2 Geographic miles to 1 Inch.	1800.	In bad order, almost destroyed.
	Commissioner's Office Soonderbuns.						
88	11	Map of the Dum-Dum Cantonments.	Ensign Buxton, Engineers.	Original. ..	1 Mile to 1 Foot.	1816.	This Map is in a midding condition.
89	13	Map of the Soonderbuns adjoining the Districts of the 24-Pergunnahs and Kissennuggur.	Lieutenant Hodges.	Lithographed Copy	Ditto to ¼ In.	1831.	This is in good state.
90	17	Map of the Soonderbuns adjoining the District of Jessore.	Ditto.	Ditto.	Ditto.	Ditto.	This Map is in a good state.
91	33	Map of the Soonderbuns adjoining the District of Backergunge.	Ditto.	Ditto	Ditto.	Ditto.	These three Maps are in a good condition.
92	36	Map of the Soonderbuns adjoining the District of Backergunge.	Lieutenant Hodges,	Lithographed Copy	1 Mile to ¼ Inch.	1831.	This Map is in a good condition.
93	47	No. 1. Survey of the Soonderbuns boundary line continued from Pranpore..	Ditto.	Ditto.	Ditto to 4 In.	1829.	This is in good state.

MAPS, PLANS, AND LAND SURVEYS.

No.	Commissioner's Office Soonderbuns.	Title of Maps.	Author's Name.	Original or Copy.	Scale.	Date.	Remarks.
94	60	No. 8. Survey of the Soonderbuns boundary line continued from Pranpore..	Lieutenant Hodges	Lithographed Copy.	1 Mile to 4 Inch.	1829.	This is in good state.
95	61	No. 9. Survey of the Soonderbuns boundary line continued from Pranpore..	Ditto.	Ditto.	Ditto.	Ditto.	This Map is in a good state.
96	72	No. 1. Abstract of the boundary of the Soonderbunds, comprising No. 1, 2, and 3.	Ditto.	Ditto.	1 Mile to 1 Inch.	Ditto.	Ditto.
97	129	Map of the Soonderbuns adjoining the District of 24-Pergunnahs and Kissennuggor.	Ditto.	Ditto.	1 Mile to ½ Inch.	1831.	This Map is in a good state.
98	130	No. 13. Survey of the Soonderbun's boundary line continued from Pranpore.	Ditto.	Ditto.	1 Mile to 4 Inch.	1830.	Ditto. ditto.
99	131	No. 1. Abstract of the boundary of the Soonderbuns, comprising Nos. 1, 2, and 3.	Ditto.	Ditto.	1 Mile to 1 Inch.	1829.	Ditto. ditto.
100	....	N. B. Besides the above, there are nine Field Books relative to Captain Prinsep's Survey of the Soonderbuns and of the Puteet Abadee Estates in the 24-Pergunnahs, four of Capt. Hodges of the Soonderbuns boundary Line, and two volumes of Areas and Offsets.					
	Zillah Nuddeah, Judge's Office.						
101	2	Map of part of the Soonderbuns.	John Garstin, Surveyor General. ..	Copy.	Not mentioned.	22nd Dec. 1810.	In pretty good condition.
	24-Pergunnahs Collector's Cutcherry.						
102	1	Map of the Country from 30 to 40 Miles from Calcutta including the Company's Land or the 24-Pergunnahs.	No name.	Copy. ...	No Scale.	No date.	This Map has been recently purchased for the use of this office.
103	3	Ditto Khasellehal Buranuggur.	John Kelso.	Ditto.	Ditto.	1828.	In good condition.
104	4	Plan of the Artillery Ground at Dum-Dum.	Lieutenant J. Gordon.	Ditto.	Ditto.	1823.	Tolerable condition.
	Residency Special Commission Calcutta and Moorshedabad Division.						
105	....	Portion of the Soonderbuns.	J. H. Madge.	Original. ..	None.	None.	Tolerable state.
106	10	Soonderbuns Forest.	None.	Ditto.	Mile, Inch. 1—4	April, 1830.	Ditto.
107	....	Soonderbuns Forest, S. E. Portion of River Megna. ..	Ditto.	Copy.	2—1	None.	Ditto.

MAPS, PLANS, AND LAND SURVEYS.

No.	Residency Special Commission, Calcutta and Moorshedabad Division.	Title of Maps	Author's Name.	Original or Copy	Scale.	Date.	Remarks.
108	....	Part of the Country between Pootee Khalee and the Bhyrub River	B. W. Goldie, Lieut. Engineers.	Original.	None.	1831.	In a good state.
109	....	A new and correct Map of the S. E. part of the Soonderbuns.	T. H. Madge.	Copy.	Ditto.	1808.	Old.
110	...	Hooghly Kishenagor and 24-Pergunnahs.	None.	Original. ..	Ditto.	None.	In a tolerable state.
111	9	Boundary of the Soonderbun Forest.	Ditto.				
	Office Board of Customs Salt and Opium and Marine Board.						
112	A 1	Plan of the City of Calcutta.	Captain T. Prinsep	....	Feet, Inch. 500—$1\frac{9}{10}$	No date.	A Lithograph Engraved.
113	2	Tassin's Map of Calcutta. ..	J B. Tassin.	....	Mile. $\frac{1}{4}$—1	1832.	
114	3	Map of the Suburbs of Calcutta.	Lieut. G. Lindsay, Engineers	....	....	1819.	
115	4	Part of Calcutta with the latest improvements (Old) ..	W. Osborn.	....	1—$4\frac{3}{4}$	No date.	Engraved.
116	19	Map of the Salt Chokies and their under Chokies on the West side of the Hooghly.	Not mentioned.	....	5—$1\frac{3}{8}$	Ditto.	Reduced from Rennell.
117	25	Map of the Soonderbuns. ..	Ditto.	....	2—1	Ditto.	
118	26	Ditto ditto ditto	Hodges	Original.	5—$1\frac{1}{8}$	1831.	Lithograph.
119	29	South Eastern Part of Soonderbuns.	Madge.	....	1—$\frac{3}{4}$	1829.	Lithograph. This Map shews the allotment of lands and the names of individuals holding them.

MISCELLANEOUS AND GENERAL PLANS.

No.	Office	Title of Maps	Author's Name.	Original or Copy	Scale.	Date.	Remarks.
	Chief Engineer's Office.						
1	10	Plan of the Company's Lands, by	Barnard.	....	....	....	In good condition.
	Quarter Master General's Office.						
2	111	Map of the Bengal Presidency, including the Lieut. Governorship of the Eastern Provinces, and parts of the Country under the Presidencies of Madras and Bombay, and of the adjacent independent states, shewing all the principal Roads and States, the general features of the Country and the Territorial Divisions, compiled from the latest and most authentic Documents, (in two parts.)	Captain Garden, A. Q. M. G.	....	16—1	1836	Injured.

List of Plans in the Lottery Office.

No. 1. Plan of the River side from Chandpaul Ghaut to the New Custom House.
2. Ditto of ground at Hauteollah.
3. Ditto of River side.
4. Ditto of ditto ditto.
5. Ditto of ditto ditto.
6. Ditto of ground at Hauteollah belonging to Rajnarain Sain required for the new Road
7. Ditto King's Bench Walk.
8. Ditto, or sketch of the Town of Calcutta.
9. Ditto of Ruth Ghaut, &c.
10. Ditto of the proposed road connecting the Chitpore and Simleah Roads.
11. Ditto of Durmahutta Street, &c.
12. Ditto of the new Road from the College Square to Circular Road and its vicinity.
13. Ditto of Clive Street
14. Ditto, or elevations of the North and South fronts of the Town Hall.
15. Book of Plans and levelling sections of the principal Streets through Calcutta, taken by order of Government, and under the Superintendence of the Lottery Committee, in the year 1820, by Lieut. J. A. Schalch, &c. &c.
16. Plan of Calcutta in four parts, by Lieut. J. A. Schalch 1820.
17. Plan of Jackson's Ghaut and its vicinity.

List of Maps and Plans in the Town Hall belonging to the Lottery Committee, dated the 19th July 1836.

No 2. Town Hall.
3. Bowannypore Road to Russapaglah.
5. Circular Road.
6. Plan of Calcutta.
7. Map of Kidderpore.
9. Bow Bazar Cross Road to Mutchuah Bazar Road.
10. Mutchooa Bazar.
11. Intended Road from Mr. Templeton's on the Circular Road to Chowringhee.
12. New Road leading to Mutchoah Bazar.
13. Jaun Bazar Road to Collingah.
14. Steam Engine.
15. Plan shewing the proposed alteration in front of the Town Hall and Government House.
16. Bankshall.
17. Plan of the Bridge to be built opposite Simlah Drain and Cross Chitpore Road.
19. Durumtollah, Cossitollah, and Bow Bazar to Circular Road.
20. Drain from Durumtollah Road to the Balliaghaut Canal.
21. Colingah Street.
22. Plan Free School Road.

No. 23. Saum Bazar Bridge.
24. Saum Bazar Road to Circular Road.
25. Bow Bazar to Durumtollah.
26. Plan—a House and Tank.
27. Jane's Plan of Tank.
28. Paterah Ghaut Street.
29. Plan of Ground and Tank at Mudden Barber's.
30. Durumtollah and Bow Bazar Road.
31. Circular Road.
32. Mr. Smith's and Durumtollah Road.
33. Inhabitants of Chowringee Lane.
34. Jaun Bazar and Chowringee Lane.
35. Balliaghaut Road.
36. Balliaghaut Canal Passes.
37. Manicktollah Street and Circular Road.
38. Esplanade of the New Fort.
39. North and South Improvements.
40. Drain mentioned Improving Town of Calcutta.
41. Chitpore Road at Fouzdar's House.
42. Plan of Mr. Howard's Premises.
43. Salt Water Lake.
44. Bankshall Street and Tank Square.
45. Sale of valuable ground at Hastings' Place.
A Map of the Roads and Lanes' City of Calcutta.
47. Circular Road to Jorahtollahs' Roads.
50. Bankshall Street and Council House Street.
51. Allypore Road and General Hospital.
52. Harryparrah Lane.
54. Original Sketch.
55. Map of Calcutta.
56. Iron Railing to the Bankshall.
57. Wellesley Street and Free School Street.
59. Suburbs Bally-Gunge and Bowanypore.
60. Ground South of Fort William.
62. Plan Free School Street and Royd Street.
63. Unfinished Plan part of Calcutta.
66. Short's Bazar.
67. Plan of Ghauts from Bankshall to Chandpaul Ghaut.
68. Plan of Canal.
69. Plan of Churruckdangah Street.
73. King's Bench Walk to Hare Street.
75. Colingah Road.
76. Mahrattah Ditch, Chitpore Bridge to Circular Road.
77. Roads between Jaun Bazar and Collingah Street.
79. Mangoe Lane.
80. Plan of proposed Tank, Beparetollah.
81. Imaumbarry Lane.
82. St. James' Church, &c.
83. Park Street.
84. Plan shewing Improvements made by the Lottery Committee.

No. 85. Plan of the Dingah Bungah.
89. Plan of New Road, Wellington Street.
90. Moorgyhattah Road.
91. Jackson's Ghaut Road to Chitpore Road at Fouzdar's House.
92. Plan, part of Dingah Bungah Road.
93. Plan of a Tank, &c.
102. Camac's Estate.
107. Chowringhee Road at Park Street.
124. Plan of Fouzdar's Premises, Chitpore Road.
131. Plan of proposed Road from Chitpore Road to College Square.
133. Plan of New Road from Park Street to Wellington Square.
136. Plan shewing Improvements made by the Lottery Committee.
161. Plan from Major Schalch's Map of Calcutta, Ranee Moody Gully, Crooked Lane
163. General Plan of Waterloo Street.

(Sd.) JOSEPH DE'HEZETA,
Secy. L. C

No. 7.

To W. H. MACNAGHTEN, ESQ.

Secretary to the Governor General Revenue Department.

Mis. Rev. 8th May 1832.

Sir,

I am directed by the Honorable the Vice-President in Council to transmit, for His Lordship's consideration, the accompanying original Letter* from the Military Board, dated the 12th ultimo, with its enclosures, on the subject of the Circular Canal.

I have, &c.

(Signed) J. THOMASON,

Deputy Secretary to Government, Revenue Department.

No. 8.

Revenue, Simla, 12th June, 1832.

To J. THOMASON, ESQ.

Deputy Secretary to Government, Revenue Department.

Sir,

I am directed by the Right Honorable the Governor-General, to acknowledge the receipt of your letter, dated the 8th ultimo, submitting† Correspondence from the Military Board, respecting various Improvements in the Circular Canal.

2. In reply, I am desired to submit such observations, as a careful consideration of the Documents furnished in connexion with this subject has suggested to His Lordship.

3. The obstacles opposed to the successful completion of the Circular Canal appear to be first, the probability that the free entrance of the Stream of the Hooghly into the Canal may raise the surface of the latter so high in the Rainy Season, that the mouths of the Drains leading from Calcutta will be stopped up, and the Drainage thereby impeded, at a time when its free maintenance is indispensable for the safety of the City.

4. To this it is replied by Mr. Prinsep,—First, that as the Marhatta Ditch on the North and Tolly's Nullah at the South extremity of Calcutta, do both receive Drains from some parts of the City, and are both open to free ingress of water from the Hooghly, without the production of any such injurious effects, in like manner no such effects would follow the opening of the Circular Canal; and; Secondly, that the construction of a Lock at the entrance to the Circular Canal, by which the ingress of water from the Hooghly can be checked when necessary, will effectually prevent any injurious rise of water in the Canal's bed.

5. On this point His Lordship is of opinion, that the Lock at the entrance of the Canal is well calculated to answer the proposed end; that it will prevent any injurious rise of water in the Canal, and farther, that boats may pass through the Lock as fast as the nature of a locked passage will admit without perceptibly raising the general Surface of the water in the Canal. This being the case, and the Lock being thus considered an effectual protection against the evil consequences of a flow of water from the Hooghly, it becomes unnecessary to investigate the application of the cases of Tolly's Nullah and the Marhatta Ditch.

* This Paper will be found printed in App. to App. H. marked No. [illegible] —J. M.

† For this correspondence see Papers printed in App. to App. H. marked [illegible] —J. M.

6. To the construction of a Lock it is objected in Col. Galloway's Minute, that to obtain the security proposed by the establishment of a Lock, it will be necessary to keep the Gates shut, that in that case a Lock with a single chamber will only pass 48 boats in the day, and that a Navigation so limited, materially reduces the utility of the Canal. On this point, His Lordship conceives, that the apprehensions expressed are unfounded. Instead of requiring 25 minutes to pass a boat, as stated by Col. Galloway, 6 Minutes would, in this instance, as it is in English Canals, be a liberal allowance. The passage, moreover, instead of being limited to 12 hours in the day, may safely extend to 14, so that the number of Boats that might pass in the day, may be reckoned at 140 instead of 48, and indeed in case of emergency, a stoppage of the Traffic might be prevented by working the Gates throughout the night The establishment therefore of a Lock with a single chamber appears likely to be sufficient for the extent of Navigation required ; and it further appears, that a Lock of this description, built as Mr. Prinsep proposes, might be constructed with a view to an eventual call for a second chamber, without any injury whatever to the original work. Under these circumstances. His Lordship recommends that the work in question be completed at once.

7. The second obstacle to the completion of the work arises from the shoals which are caused at the mouth of each Drain, by which it is alleged, that the Navigation will be impeded to such a degree as to render the Canal of little use.

8. With reference to this point, it is considered by the Military Board, that the alternate flow of water from the Hooghly towards the Salt Water Lake, and vice versa, will have the effect of scouring the bottom of the Canal, and removing a great portion of these shoals. Col. Galloway, on the other hand, considers, that the current in the Canal, will not be sufficiently strong to remove the shoals in question. On this point His Lordship is disposed to coincide in opinion with Col. Galloway. His Lordship does not however consider that the alternate currents will have no effect whatever. On the contrary, it appears to him. that these currents although not sufficiently powerful to force the shoals altogether out of the Canal, will have the effect of spreading those deposits which are now lodged in heaps at the mouths of the Drains uniformly over the Canal's bed, and that when once the communication with the Hooghly is opened, the consequences looked for, will be not a succession of shoals and hollows, but the very mitigated evil of a gradual rise in the Canal's bed. This gradual rise, the effect of the constantly increasing mass of deposits from the Calcutta Drains, will, His Lordship conceives, be little if at all diminished by the current in the Canal, but must be removed by some other means.

9. Col Wood's Committee have mentioned three modes of effecting this object First, by Dredging Machines, to the application of which, as costing 15,000 Rs. a year, the Committee decidedly object. Second, by establishing bunds across the Canal, and clearing it out by hand , and, Thirdly by constructing a separate Channel for the Drains to convey the Drainage into the Southern Division of the Lake, out of the line of navigable communication. Col. Galloway appears to have entirely mistaken the meaning of Col. Wood's Committee, where he states, that they mention an annual expenditure of 15,000 Rs. to be indispensable for the clearance of the Canal. The Committee, on the contrary, merely state, that to keep the Canal clear by means of Dredging Machines would cost that sum, but at the same time they recommend another mode of effecting this object, namely, by hand labour. In this recommendation His Lordship is disposed to concur, and he would further suggest, that as soon after the close of the Rainy Season as the fall of the River will admit of the greatest possible Drainage from the Canal, a temporary bund be thrown across the latter immediately beyond the shoals, and then that the stream of the Circular Canal be drawn off as far as possible by opening the Gates of the Lock at low water. By the statement contained in Mr. Prinsep's letter, No 379, to the Secretary to Military Board.

[illegible]

paragraph 6, it appears, that the level of the water in the Canal will by this means be so far reduced, as to enable the labourers to remove the soil without difficulty; and it would appear that by employing strong working parties, the deposits may be removed without any material interruption of the Navigation, and at an expense far short of the outlay attending the use of Dredging Machines.

10. Another objection to the work, is the apprehension expressed by Col. Galloway, lest the current from the Lake to the River should contaminate the latter, and make the water lying along shore on the Calcutta side of the River, brackish and impure; to this objection may be opposed Col. Galloway's opinion, as recorded in his own Minutes that the current from the Lake to the River will not have the effect of carrying any portion of the deposits from the Drains into the Hooghly; nor, His Lordship observes, will the small stream which it may be necessary to admit from the Lake to the River, have any sensible effect in communicating the saline properties of the former to the River water, consumed by the inhabitants of Calcutta.

11. It is stated in Col. Galloway's Minute as an objection to the work, that the cost of the Lock is to be 98,912 Rupees, and that the purchase of the ground for it would be perhaps as much more; but the cost of the Lock with a single chamber, as now in progress, is expected by the Board, to be about 50,000 Rupees, and the objection arising from the cost of the ground, whatever might have been its value, is already overruled, as the Lock being commenced, the purchase of the ground must of course have ere this been effected.

12. The above statements comprise all the points that are noticed in the Papers forwarded for His Lordship's consideration, and it only remains to recapitulate in a few words, the mode of proceeding which he would recommend for adoption.

13. In the first place the Lock, which is already in progress, should be completed as soon as possible. The command thus obtained over the water of the Hooghly will enable Government to determine, how far the stream in the Canal will have the effect of removing the shoals. If farther clearance be required, a temporary bund should be established at whatever spot in the Canal the position of the deposited matter may point out, and the Canal should be cleared by hand. It will still remain for experience to shew, how far this clearance by hand will prove an effectual remedy, and whether it may not eventually be necessary to have recourse to a separate line of Drainage; but in the meantime His Lordship conceives, that the clearance by hand, as it involves little expense, and will not in the slightest degree prevent the future undertaking of a more certain, though more costly expedient, is under all circumstances, the measure best calculated for immediate adoption.

14. The original Papers which accompanied your letter are herewith returned.

I have, &c.

W. H. MACNAGHTEN,

Secretary to the Governor-General.

No. 9.

No. 316.

To W H. MACNAGHTEN, ESQ.

Secretary to the Governor-General, Head Quarters, Simla.

Revenue, the 10th May 1831

SIR,

I am directed by the Hon'ble the Vice-President in Council to transmit to you the accompanying Dispatch* from the Honorable the Court of Directors, dated 10th November 1830, on the subject of Draining the Salt Water Lake, and altering the course of the Circular Canal, and to request that you will submit it for His Lordship's perusal with the other Papers† specified in the margin.

Revenue Consultation 16th Feb. 1830 No. 7 to 14,

I have, &c.

(Signed) J THOMASON,

Deputy Secretary to Government Revenue Department.

No. 10.

No. 831.

To JAMES THOMASON, ESQ

Deputy Secretary to Government, Revenue Department.

Revenue Department

SIR,

I am directed by the Right Honorable the Governor-General to acknowledge the receipt of your Letter, dated the 10th instant, with its enclosures, and to request that you will inform the Honorable the Vice-President in Council, that His Lordship proposes to retain the Hon'ble Court's Dispatch of the 10th November last, and the references which accompanied it, on the subject of the Salt Water Lake, until his return to the Presidency.

I have the honor to be,

Sir,

Your most obedient servant,

SIMLA, *The 25th May* 1831,

(Signed) W. H. MACNAGHTEN,

Secretary to the Governor-General.

* This Paper will be found printed in App. G, page 28.—J. M.

† These Papers will be found printed in App. G pages 1 to 27 inclusive.—J. M.

No. 11.

No. 824

To F. J HALLIDAY ESQ

Secretary to the Government of Bengal.

SIR,

I am instructed by the Fever Hospital and Municipal Committee, to request you to favour them with a Copy of any Minutes in the Government Records, relative to the appointment of a Committee named by the Right Honourable Lord William C. Bentinck Governor-General, to consider the subject of Draining the Salt Water Lake and the Town of Calcutta, and of continuing the Circular Canal round to the Westward of the Salt Water Lake.

That this Committee was appointed, as well as the names of the gentlemen who composed it, which I have inserted on the margin,* appears by a letter addressed by Major Taylor, to Dr Strong under date the 27th December 1824, printed in a †paper of Dr. Strong's on the Topography of Calcutta, at page 94 of that Paper, which letter desires the attendance of Dr. Strong on the Committee upon the Tuesday following.

* *Names of the Committee*
D M'Farlan, Esq. R. D Mangles, Esq Captain Steel, Dwarkanath Tagore, Col Galloway, Hoseason, Esq J Kyd, Esq Captain Fitzgerald, Ramcomul Sen, Col Tickell, C. E., J R Colvin, Esq. J Prinsep, Esq. Captain T Thomson, Captain Forbes

† See App. J page 60 where Copy of this Paper is printed J M

The Fever Hospital and Municipal Committee have not been able to trace any of the Proceedings of this Committee nor the Instructions under which they acted

I have the honour to be
Sir,
Your most obedient and humble Servant
(*Signed*) J. P GRANT
Chairman, Fever Hospital and Municipal Committee

MUNICIPAL OFFICE, TOWN HALL
18th November, 1840

No. 12.

No 825.

To MAJOR W. N FORBES,

Mint Master, and Superintendent of Government Machinery Presidency

SIR,

The Fever Hospital and Municipal Committee, of which I have the honour to be Chairman, observe in a paper printed by Dr. Strong on the Topography of Calcutta at page 94, mention made of a Committee appointed in 1834, by the Right Honourable Lord William C. Bentinck, to consider the subject of Draining the Salt Water Lake and the Town of Calcutta, and of continuing the Circular Canal round to the Westward of the Salt Water Lake.

The Committee observe your name mentioned as a member of that Committee, but not having been able to trace any Proceedings of this Committee, which would be most material in the prosecution of their present inquiry, they have directed me to request you

to give them any information you may possess on this subject, and in particular, where they may apply for the Minutes of the Proceedings of the said Committee, if any Proceedings were taken.

It appears from Dr. Strong's Paper, that the Committee was to meet on one occasion on the Tuesday following, the 27th December 1834, at which meeting Dr. Strong was written to by Major Taylor, to attend.

I have the honour to be,
Sir,
Your most obedient and humble Servant,
(*Signed*) J. P. GRANT,
Chairman, Fev. Hosp. and Munl. Committee.

MUNICIPAL OFFICE, TOWN HALL,
The 18th November, 1840.

NOTE.—The like Letter was addressed to Dr McFarlan, Esq. and Capt. W. R. Fitzgerald (Engineers) the reply of the former Gentleman is printed in App. I. at page 12 and that of the latter on this page of this App marked No. 13.—J. M.

No. 13.

No. 285

To THE HONORABLE SIR J. P. GRANT,
Chairman, Fever Hospital and Municipal Committee.

SIR,

In reply to your Letter, dated the 18th instant, I have the honor to inform you, I am not aware that any Minutes of the Proceedings of the Committee appointed in 1834, by the Right Honorable Lord William C. Bentinck, to consider the subject of Draining the Salt Water Lake, and of continuing the Circular Canal round to the Westward of the Salt Water Lake were recorded, on the only occasion that the Committee ever assembled; viz. on the Tuesday following the 27th December 1834, as mentioned in your letter

I have the honor to be,
Sir,
Your obedient Servant,
W. R. FITZGERALD,
Civil Architect.

FORT WILLIAM,
28th November 1840

No. 14.

To THE HONORABLE SIR J. P. GRANT
Chairman, Fever Hospital and Municipal Committee.

SIR,

In reply to your Letter of date the 18th instant, I have the honor to state, that in conjunction with the late Captain John Thomson, then Superintendent of Canals, I was appointed a Member of a Committee to consider, in connexion with the work then in progress in the portion of the Eastern Canal passing through the Salt Water Lakes, the practicability of Draining the adjacent Low Lands, and that as the Report prepared was forwarded by Captain Thomson, to the Military Board, I conceive it is probable a copy* of it may be found amongst the Records of his Office, in the year adverted to by Dr. Strong's Paper, 1834.

* For which see App. G page 37.—J. M.

2nd. Having previously attended various Meetings, or Committees, directed to assemble at the Government House, with reference to this subject, in the presence of the Right Honorable Lord William Bentinck, it is only from not having been aware that any Report resulted from these, that I have been induced to conclude the Report above mentioned was the one alluded to by Dr. Strong ; but if the conclusion is correct, Captain Boileau, of Engineers, the present Superintendent of the Circular and Eastern Canals, will readily be able to furnish a Copy of the Report.

3rd. According to the best of my recollection, its substance was, that if the disputed claims of neighbouring Zemindars to property in the Lands and Fishings of the Lakes could be arranged, the object in view could be accomplished.

4th. Believing that, in consequence, a reference on these points was made to the Local Commissioner, I have not since learned what was the result of the enquiry.

I have the honor to be,

Sir,

Your most obedient and humble Servant,

W. N. FORBES,

Mint Master and Superintendent Government Machinery.

MINT.
November, 20th 1840

No. 15.

No. 830

To F. B. KEMP, ESQ.

Commissioner of the Soonderbuns

SIR,

In answer to a Letter from me requesting information regarding the Proceedings of a Committee appointed by Lord William Bentinck, to consider of the Draining of the Salt Water Lake, and continuing the Circular Canal, of which that Gentleman appeared to be a Member, Major Forbes states, that he believes that a reference on these points was made to the Local Commissioner, and that he has not since learnt what was the result of the inquiry.

I have the honor to request of you, for the use of the Municipal Committee, of which I am Chairman, any information you may possess regarding the existence and the nature of the reference, and its result if any.

I have the honour to be,

Sir,

Your most obedient and humble Servant,

(Signed) J. P. GRANT,

Chairman, Fev. Hos. and Munl. Committee.

MUNICIPAL OFFICE, TOWN HALL,
23rd November, 1840.

No. 16.

No 838

To F. B. KEMP, ESQ.

Commissioner of the Soondurbuns.

SIR,

I had the honour to address you a Letter on the 23rd November 1840, at the desire of the Municipal Committee, to whom the Government have referred the subject of the Drainage of the Salt Water Lake, in which I requested you to furnish me, for the use of the Committee, with any information you might possess regarding the existence, the nature, and the result, if any, of a reference said to be made to the Local Commissioner by Lord William C. Bentinck, regarding the Draining of the said Lake, and the continuing of the Circular Canal, to which Letter I have not yet had the honour to receive an answer.

I observe in a Minute of Lord William Bentinck, of date 16th February 1830, it is remarked by him, that the Salt Water Lake had been disposed of in perpetuity, paying a rent of about 4,000 Rupees to Government

The profit of the Zemindars, His Lordship says, as he learnt from the Commissioner, from the Fisheries, from Reeds, and from Lands from which the water had receded, amounted to about 16,000 Rupees.

He learnt from the same source that the proprietors would not be unwilling to sell their property. There was a doubt whether the Land as well as the Water and the right of Fishery belonged to the Zemindar or to the Sircar. The right he said was about to be tried

It would be very obliging if you could inform the Committee, whether the points stated in the above paragraph of this Minute, so far as the profits to the Zemindars, and their willingness to sell may now be taken to be correct, and whether the doubt as to the property being in the Zemindar or in the Sircar still subsists, or the trial alluded has been had and the point settled, and how.

Your answer at your earliest convenience will oblige the Committee.

I have the honour to be,
Sir,
Your most obedient and humble Servant,
(Signed) J. P. GRANT,
Chairman, Fev. Hos. and Munl. Committee.

MUNICIPAL OFFICE, TOWN HALL,
5th January, 1841.

No. 17.

No. 835.

To THE HONORABLE CAPTAIN OSBORNE.

Military Secretary to the Governour General.

SIR,

The Fever Hospital and Municipal Committee, of which I have the honour to be Chairman, observe in a Paper* printed by Dr. Strong, on the Topography of Calcutta, at page 93, mention made of certain Papers of the late Dr. Francis Hamilton Buchanan, having been returned in 1830, by Dr. Strong, to Major Benson, Military Secretary to the Governour General.

The Committee are desirous of obtaining the above Papers, and have directed me to request, that you will have the goodness to cause a search to be made for them amongst the Records of your Office.

I have the honour to be,
Sir,
Your most obedient and humble Servant,
(Signed) J. P. GRANT,
Chairman, Fev. Hosp. and Municipal Committee.

MUNICIPAL OFFICE, TOWN HALL,
9th December, 1840.

No. 18.

No. 1260

SIR, *Govt. House, 21st December.*

I have to apologise to you for the delay which has occurred in replying to your Letter of the 9th instant, owing to mistake in my office.

I regret to say, that it is out of my power to comply with your wishes relative to the Papers of the late Dr. F. H. Buchanan—all the Records from this Office having been removed on Col. Benson's leaving it.

I have the honor to be,
Your obedient Servant,
W. G. OSBORNE.
Military Secretary.

J. P. GRANT, ESQ.
&c. &c.

* Referring to that in the Quarterly Journal of the Calcutta Medical and Physical Society—&c. See App. J Paper marked No. VII. *i.* at page 64, where a copy of the Paper referred to is printed.—J. M.

APP

No. 19.

Extract—Proceedings of the Committee upon the Fever Hospital and Municipal Improvements, 7th January 1841.

The Chairman states, that in answer to an inquiry by himself to Major W. N. Forbes, he had received a private communication, dated 16th January 1839, from that gentleman, stating, that the Salt Water Lake might be easily Drained; that to silt it up it would be necessary to admit alluvial-charged water at the head of it from the Hooghly—a measure which he says, he perceives Dr. Martin's excellent Paper in some degree objects to. That the main practical difficulty, is, that the ground composing the Lake, is private property; and that for giving it up to Government for Improvement, the Proprietors ask nine Lacks of Rupees—a sum he observes, that makes a very unsatisfactory addition to the indispensable cost of the Dramage works, viz. the Cut from the Hooghly, Bunds, Sluices, &c.; that he Captain F. is not acquainted with the Guiana works, but will endeavour to obtain it; and that Captain Boileau, the Superintendent of Canals, would be the best able to afford the Committee any information they might require regarding the Salt Water Lake.

No. 20.

No. 7.

To J. P. GRANT, ESQ.

Chairman, Fev. Hosp. and Municipal Committee.

SIR,

I have the pleasure to acknowledge the receipt of your Letter, No. 838, of the 5th instant.

2nd. I can find no correspondence in the English Department of this Office respecting the Salt Water Lake beyond the Minute of Lord W. Bentinck, which document it appears you have opportunities of referring to—I conclude Mr. Dampier, who held the office of Commissioner in the Soonderbuns in 1830, must have been in personal communication with his Lordship on the subject; a reference to Mr. Dampier might clear up this point, and elicit the information sought for by the Committee.

3rd. I am not aware of the willingness or otherwise of the Zemindars to sell their property, and without the Native Records of my Office to refer to, I am unable to state whether any suit involving the Right of Government to the Lands and Right of Fishery of the Salt Water Lake was ever instituted, or the result thereof. All my Records have left for Backergunge, on my arrival at that place, I will cause a search to be made, and inform you of the result.

I have the honor to be,
Sir,
Your most obedient Servant,
F B. KEMP,
Commissioner.

SOONDERBUNS COMMISSIONER'S OFFICE,
ALLIPORE.
The 9th January, 1841.

P. S.—I observe in the Office Registry of Cases under Reg. II. of 1819, and III. of 1828, a suit for 60,000 Beegahs Salt Water Lake, in which the Government claim was dismissed by Mr. Dampier, on the 21st January 1830.

F. B. KEMP,
Commissioner.

No. 21.

No. 112.

To THE HONORABLE SIR J. P. GRANT, *Kt.*
Chairman, Fever Hospital and Municipal Committee,

Revenue.

HONORABLE SIR,

I am directed by the Right Honorable the Governor of Bengal to acknowledge the receipt of your Letter of the 18th November last, and in reply to state, for the information of the Committee, that after a strict search amongst the Records of this Office, no Minutes or Papers* having reference to the Proceedings of the Committee, named on the Margin of the 2nd Para. of your Letter, are forthcoming.

I have the honor to be,
Honorable Sir,
Your most obedient Servant,
J. H. YOUNG,
Deputy Secretary to the Government of Bengal.

FORT WILLIAM,
The 19th January, 1841.

No. 22.

Extract—Proceedings of the Committee upon the Fever Hospital and Municipal Improvements, 4th February 1841.

The Chairman and Capt. Boileau report, that they had visited the Dhurrumtollah Cess Pool and Entally Canal in Company with G. J. Gordon, Esq. and had inspected the digging going on there, with the view of forming an opinion of the quantity of Silt deposited in the upper part of the Entally Canal from the flow of the Tide from the Salt Water Lake.

They observed, that there are none of the inner Drains of the Town which are discharged into that part of the Canal, and but a very few Drains of any sort which deposit apparently very little Silt. The whole therefore, of the Silt there deposited, may be taken as furnished by the Tidal Waters, and it appears from Capt. Boileau's report, that this is so

* NOTE - From certain Memoranda found in the Government of India Proceedings of the 5th March 1835, Nos. 8 to 11, and from other Papers which have come under the observation of the Municipal Committee, it appears that no Minutes were Recorded of the Proceedings of the Committee convened by Lord Wm. Bentinck, on the Tuesday following the 27th Dec. 1834, or, according to one of the above Memoranda, by R. D Mangles, Esq. in pencil, as follows.—"We met once or twice, but did nothing but talk;" and the evidence obtained by the Municipal Committee, and printed at pages 37 to 40 of App. I. and App. J. page 29, that any thing beyond mere desultory discussion took place at that meeting. No orders were passed by the Government of Bengal on the Military Board's Committee's Report on the Drainage of the Salt Water Lake, App. G. page 36; but that Committee's Report was brought to the notice of the Hon'ble Court in a Dispatch of the Council of India, of date the 23d Dec. 1835, para. 82, and the subject from that period not resumed (See App. G. page 53, Paper marked No. VIII) till the receipt of the Hon'ble Court's Dispatch, (Revenue Department No. 4) of the 2d May 1838, to the Government of Bengal (See App. G. page 54, No. IX) when the further consideration of the matter was transferred to the Municipal Committee, in a Letter from Mr. Secretary Halliday of the 18th Sept 1838 -See App. G page 56.—J M.

great as to cause an accumulation of 3¼ to 4½ feet in the course of 4 or 5 years, which is now dug out once in that time by manual labour. They observed, that in the Circular Canal, which has a flow of Water into it from the River at high water through the Sluice, there appeared to be no deposit, the Canal being kept sufficiently clear for the purposes of Navigation by the periodical flow of water from the Hoogley to the Salt Water Lake; and Capt Boileau states, that the Circular Canal has never received or required cleansing since it has been under his management. It would appear therefore, that the observation of Lord Wm. Bentinck, in his Minute App. G. No. 1, page 3, "the water by which the Lake and the Entally Canal are now filled is exclusively Tidal, and clear," is founded upon a mistake with regard to the clearness of that Water in reference to assisting the Silting process, although undoubtedly it must be charged with less alluvial matter than the waters of the Hoogley.

Secondly, it appears that the flow of water through a Lock Gate, of the size of that of the Circular Canal, is sufficient to keep the Canal clear for the purposes of Navigation.

The crowding of the Craft in the Circular Canal, and the great impediment thereby caused to the Navigation, was very striking, although perhaps the boats were somewhat more crowded from the closing the head of the Entally Canal, rendered necessary by the digging out of the deposit—but the above Members cannot but recommend to the Committee to inquire and consider whether it would not be very material, in order to enable the Bahaghatta, the Entally, and the Circular Canals to afford all the advantages to the Navigation of which they are capable, that a direct communication should be opened between the Entally Canal and Tolly's Nullah; and whether a Harbour or Basin ought not to be constructed nearer the point where the boats frequenting the Circular Canal usually deposit their lading, than where the present Harbour or Wet Dock is situated, is not also necessary for this purpose. The Members of the Committee observe, that several considerable Drains empty themselves into the Circular Canal, but it was observed by Capt. Boileau, and indeed was sufficiently apparent, that the quantity of Silt they brought into the Canal does not impede the Navigation, but is entirely swept away by the periodical current admitted into the Canal through the Lock Gate.

No. 23.

No. 870.

To J. CARNIE, ESQ.

Government Lithographic Press.

DEAR SIR,

The Committee upon the Fever Hospital and Municipal Improvements are desirous of being informed by whom the accompanying Table of Levels* was compiled, and where lithographed; if in your power, will you be so good as to afford the Committee this information. I think the Table must have been lithographed at the Government Press.

*Referring to that inserted opposite page 11 of App. I. —J. M.

I am, Dear Sir,

Yours faithfully,

(*Signed*) J. MORRIS.

Clerk to the Committee

TOWN HALL,

11th March 1841.

No. 24.

Dear Sir,

The Table was Lithographed at this Press some 6 or 7 years ago, and as far as I can recollect, on account of the Surveyor-General's Office. I am, however, not aware by whom it was compiled. I have given direction to look up the original application, to ascertain with certainty, for what office it was Lithographed; it will take sometime to effect this. When I am able to ascertain the fact, I shall acquaint you forthwith.

11th May, 1841.

Yours very truly,

To J MORRIS, ESQ.

A. CARNIE.

No. 25.

My dear Sir,

I regret to say, that I have been unsuccessful in my research; the Assistants are so busily occupied with their current duties, that they have but little spare time to look up the Records without extra assistance.

27th May, 1841.

Yours very truly.

To J MORRIS, ESQ.

A. CARNIE.

No 26

No. 249

To J. P. GRANT, ESQ

Chairman, Fever Hospital and Municipal Committee.

Sir,

I have the honor to acknowledge your Letter, No. 914, dated 31st ultimo, calling attention to your correspondence with my predecessor regarding the Government right to certain Fisheries near the Salt Water Lake. In reply, I beg to state, that on 21st December 1831, Mr. Dampier, then Commissioner of the Soonderbuns, dismissed the claims of Government, and decreed in favor of the Zemindar, which decision was upheld on appeal by the Special Commissioner on the 25th April 1831 [Qy. 1832].

2nd. What the profits of the Zemindar may be I am unable to state, neither can I inform you as to his willingness to sell his property. Should the Zemindar reply to the questions which I have put to him on the subject, I shall have much pleasure in acquainting [you] with the result.

I have the honor to be,

Sir,

Your most obedient Servant,

M. SHAWE,

O. Commissioner.

Soonderbuns Commissioner's Office,

Allipore,

The 10th September, 1841.

No. 27.

No. 1515.

To THE HONORABLE SIR J. P. GRANT,
Chairman of the Municipal Committee, Calcutta.

SIR,

In reply to your Letter of the 31st ultimo, I have the honor to acquaint you, that I believe the profits of the owners of the Salt Water Lake, i. e. of those to whom the Lake was made over in perpetuity, were about 16,000 Rupees per annum; but there are other Zemindars holding Lands on the borders of the Lake, who also derive some profits from the Fisheries immediately adjacent to their estates, and these latter would require to be indemnified for the loss they would sustain by the proposed Drainage. I recollect perfectly well, estimating roughly the probable expence of purchasing the Lake, and indemnifying all parties at five Lakhs of Rupees; but I have reason to think that the whole might be now purchased at a less cost; the Lands on the borders of it having suffered much deterioration from the great Inundation of 1833, from which they have not yet recovered.

2nd. I saw one of the proprietors of the Lake, holding an eight anna share, when I was in Calcutta last year, and he then expressed a willingness to dispose of his property in it; and indeed asked me, if the measure of Draining it was in contemplation with the proprietor of the remaining moiety I have had no communication since the decision of the suit you refer to, but I suppose he would now be willing, as he was then, to part with his share.

3d. I decided the suit for the Assessment of the Lands from which the water had receded in favour of the Zemindars; my decision was appealed from by the then Revenue Commissioner, Mr. E. R. Barwell, but it was finally upheld by the Special Commissioner, the late Mr. Walpole, so that the right of the Zemindars in the Property is completely settled.

I have the honor to be,
Sir,
Your most obedient servant,
W. DAMPIER.
Superintendent Police, L. P.

OFFICE OF SUPERINTENDENT OF POLICE,
LOWER PROVINCES.

The 1st September, 1841.

No. 28.

No. 921.

To D. MACFARLAN, ESQ.
&c. &c.

SIR,

The Committee upon the Fever Hospital and Municipal Improvements will be obliged by your furnishing, for their information, answers to the following queries :—

1. Is the Dhurrumtollah Drain so formed as to allow the Tides of the Hooghly to flow regularly through it into the head of the Intallee Canal, thus preventing, in some measure, a stagnation in that Canal?

2. If the Dhurrumtollah Drain is formed as above, will you be so good as to state, whether it was originally so formed, or has it been altered to effect the above end; if so, please to state at what period that alteration took place?

A reply at your early convenience will oblige, as the above inquiry has reference to some matter now in the press.

I have the honor to be,
Sir,
Your most obedient and humble Servant,
(*Signed*) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL,
15th September, 1841.

No. 29

No. 435.

To THE FEVER HOSPITAL AND MUNICIPAL COMMITTEE,
Calcutta.

GENTLEMEN,

In reply to a letter dated 15th September 1841, from Mr. Morris to my address, I beg to inform you, that the Dhurrumtollah Drain is not so formed as to allow the Tides of the Hooghley to flow regularly through it; no such effect as a permanent scouring of the latter can result from the present construction of the drains.

2. A report by Mr. R. J. Rose, the Superintendent of the Calcutta Roads, is annexed, shewing the depth of the Drains at the east end of Dhurrumtollah Street, with his observations on the subject of Mr. Morris' letter.

I have the honor to be,
Gentlemen,
Your most obedient Servant,
D. McFARLAN,
Chief Magistrate.

CALCUTTA POLICE OFFICE,
17th September, 1841.

No. 29. (A)

Copy.

REPORT BY THE SUPERINTENDENT OF ROADS.

The depth of the Drain on the East side of Cossitollah, at its intersection with the main Drain on the North side of the Dhurrumtollah, is .. .. *Feet*	3	7
The depth of the latter at this point is	3	4
That on the South West end of the Cossitollah Street, is	4	2

The River Water does find admittance into the main Drain on the North side of Dhurrumtollah Street by the Tunnel, which passes through the Bankshall premises, Hare Street, Old Court House Street, and Waterloo Street, but this happens only during the height of the Spring Tides during the Freshes.

I am not aware that these Drains were constructed with the view of admitting the River Tides to flow into the Dhurrumtollah Drain. The water in this drain never stagnates, as it has an excellent slope or fall, throughout its whole distance to the Canal. A basin has been formed at the head of the Entally Canal for the reception of the silt from the Town Drains. No stagnation in it, can therefore arise from this cause.

(Signed) R. J. ROSE,
Superintendent of Roads.

CALCUTTA,
17th September, 1841

(True Copy,)
D. McFARLAN,
Chief Magistrate.

No. 30.

No. 53.

To J. P GRANT, ESQ.
Chairman, Fever Hospital and Municipal Committee, Calcutta.

SIR,

With reference to your letter No. 914, of the 31st August last, and previous correspondence connected therewith, I have the honor to forward copy of my Roobocary of this day's date, together with four Original Documents as per margin,* which I request may be returned for record in this Office, when no longer required by the Committee: from which it would appear that the parties are willing to dispose of their property on obtaining what *they* consider its value.

* 1 Document from Ramchunder Roy Chowdry, &c.
1 Ditto from Pran Kisto Roy Chowdry, &c.
1 Ditto from Kallee Kunto Roy Chowdry, &c.
1 Ditto from the Collector of Zillah 24-Pergunnahs

I have the honor to be,
Sir,
Your most obedient Servant,
M. SHAWE,
O. Commissioner.

SOONDERBUNS COMMISSIONER'S OFFICE,
CAMP RAMNABAMNA,
The 11th Feb. 1842.

NOTE.—The Municipal Committee do not think it necessary to print the enclosures transmitted with the above Letter. J M

No. 31.

No. 7.

From the Officiating Deputy Secretary to the Government of Bengal in the Judicial Department.

To THE CHAIRMAN TO THE FEVER HOSPITAL AND MUNICIPAL COMMITTEE.

Judicial Department.

SIR, *Dated Fort William the 29th December* 1842.

I am directed by the Honorable the Deputy Governor of Bengal to forward for the information of your Committee, the accompanying original extract, No. 216, from the Proceedings of Government in the General Department, dated the 26th October last, containing transcript of a letter from the Honorable the Court of Directors, with a communication from Mr. Henry Wood on the Drainage of Calcutta, and the protection of the City from Inundation during Spring Tides.

2nd. The Map alluded to in Mr. Wood's Letter shall be forwarded to you when received.

I have the honor to be,

Sir,

Your obedient servant,

(*Signed*) J. S. TORRENS,

Officiating Deputy Secretary to the Government of Bengal

FORT WILLIAM,
The 29th December 1842.
EXD. H. Court.

No. 31. (A)

No. 216.

Extract from the Proceedings of the Honorable the Deputy Governor of Bengal in the General Department, under date the 26th of October, 1842.

No. 19 of 1842.

Our Governor of the Presidency of Fort William in Bengal.

Public Department.

We transmit as a number in the Packet for your consideration, the copy of a letter which we have received from Mr. Henry Wood, on the Drainage of Calcutta and protection of the City from Inundation during Spring Tides: the copy of a Map which accompanied Mr. Wood's letter is also forwarded.

We are, &c.

(*Signed*) J. L LUSHINGTON,
" JOHN COTTON,
" H. LINDSAY,
" A. GALLOWAY,
" E MACNAGHTEN,
" J MASTERMAN,
" W. B. BAYLEY,
" W. H. C. PLOWDEN,
" G. LYALL,
" H. WILLOCK,
" H. ST. G. TUCKER,
" C. MILLS,
" J. W HOGG.

LONDON,
The 24th August 1842

No. 31. A[1]

J. C. MELVILL, ESQ.

SIR,

I am induced to lay before the Honorable Court of Directors, the accompanying Map of the Suburbs of Calcutta, taken from a Survey made in the year 1817, with the following observations on the Drainage of the Suburbs and the protection of the Town from future Inundations from the side of Salt Water Lake and the sudden rise of the Sea.

2. My attention was called to the state of the Town and Suburbs, and the Country lying between it and Saugur Island, from having been employed on a Survey of the Town on my first going out to India, and having been about the same period directed by the Chief Engineer to report on the state of the Mahratta Ditch, for the purpose of constructing the Circular Road round Calcutta. At a subsequent period, my attention was called to the Levels of the Town to enable me to construct the aqueduct, and with the view of aiding Mr. Elliot in his useful labors in Draining the Town and Suburbs with the assistance of the convicts. The country lying between Saugur Island and Calcutta was under my particular observation, when, as an Assistant Engineer, I was employed to aid in devising Plans for the establishment of a Telegraphic communication between the Presidency and the Sand Heads, at the period the French invaded Egypt, and when I was employed in the same capacity to construct the Military works at the mouth of the Roopnarain River, opposite to the Sands of the James and Mary, below Fultah. The Country between Ganjam and Culpee, along the coast, came under my observation, from having been obliged to march through it in 1800, when in the possession of the Mahrattas, and from being employed as an Assistant Engineer in the District of Cuttack, immediately on its falling into our possession, when the Engineer Department had to map the country finally, to enable me to Plan and Estimate a Canal of communication between Calcutta and Channel Creek, for the purpose of communicating with the upper anchorage of Saugur Island, which I laid before the Government. I inspected the country lying between the Presidency and Culpee and onwards to Channel Creek, and made myself acquainted with its localities.

3. At Spring Tides the level of the River Hoogly is higher than the level of the Town, and the Esplanade of the Fort is often flooded by the River. The Ditches of the Suburbs are on such occasions filled by the rising of the Tides in Salt Water Lake, and the Country between the Lake and Suburbs, as well as the country between Salt Water Lake and Dum-Dum, and on the borders of Tolly's Nullah and the lower part of Garden Reach, are flooded, and become one sheet of water during the rainy season, at the height of the Spring Tides.

4. The Records of the India House will shew the great loss of life that has been caused by the Sea breaking over its natural boundaries, and laying the country on its borders under the water. The district of Ganjam, Cuttack, Balasore, and Hidgelee, the lower parts of the Hoogly River and Dacca, have, at different times been visited by Inundations of the Sea, when thousands of lives have been lost and Cattle destroyed, and large tracts of Country have been laid waste, and rendered unproductive for long periods, by the deposit of Salt, and the destruction of the population. In addition to the great loss of lives by the Inundation, sickness has invariably followed, and carried off thousands, and it is to avoid the result of such calamitous visitations, that I am induced to trouble you on the present occasion.

5. I need only call the attention of the Honorable Court to the circumstance of the level of the Town of Calcutta, and all the Country between it and the Sea at Saugur Island, being below the level of high Spring Tide, and that a rise of three or four feet of the Sea above its natural level at Spring Tides by a gale of wind from the South-east, would

sweep away the whole population, to call its serious attention to measures calculated to prevent so heavy a calamity.

6. The wooded belt of the Soonderbunds, has probably tended to protect the Country up to the present period from the visitations which have inundated other districts, the effects of which are recorded on the Proceedings of the Honorable Court. These woods I understand are clearing away, and although their breadth and yielding nature have broken the force of the Sea during many severe gales of wind, they have been unable to prevent very severe loss to the native population; and if I am correctly informed, the Inundation from the Sea in 1830-31, extended to the Suburbs of Calcutta, washing over Saugur Island and the Country about Culpee and Diamond Harbour, destroying the inhabitants and much property, and causing, on the water subsiding, dreadful sickness amongst the European and Native population of the Town of Calcutta and throughout the Country.

7. The Banks of the River Hoogly are some feet higher than the level of the Country inland, and the Town of Calcutta is drained into Salt Water Lake; Garden Reach is drained into the River through the Masonry sluices erected by Colonel Pearce at the Garden called after his name, and the Water Channels leading to these sluices need only be kept clear and open, to insure the Reach being kept dry and free from the effects of Inundation, if the Tides are kept out, and the Sea prevented from washing over the Reach in the direction of Budge Budge and the lower part of the River.

8. I would propose for the protection of the population of the Town of Calcutta and its Suburbs, as well as Garden Reach, that a Circular Bund or Embankment be erected beyond the inhabited part of the Suburbs, and along the Edge of the Salt Water Lake and other swamps surrounding the Suburbs, of the height of three feet above the highest level of the highest Tide at Chandpal Ghaut, and that the breadth of the Embankment may be made twenty feet at top, with sloping of sides at an angle of 45°, and that this Bund or Embankment may be formed by earth excavated from a Ditch or Canal between it and the Suburbs, leaving a clear space of 50 feet between the base of the Bund and the edge of the Ditch, to enable it to resist the weight of the Sea water which may be thrown against it by any sudden rising of the Sea. The Ditch or Canal will be useful in receiving the contents of all the Drains of the Town during the rains, and self-acting Sluices may be constructed on the principle of the Sluice erected by Colonel Pearce in Garden Reach, to admit of the Canal, at low water, discharging itself through the Embankment into the Salt Water Lake.

9. If such a work be constructed, the Salt Water of the Tides will be kept out of the Ditches of the Suburbs which now cause much sickness, and the Town and Suburbs will be secured from Inundation, and should the Sea unfortunately wash over the Country, the population of the Town will have a place of refuge to retire to pending the height of the Inundation, even if the Sea should force its way through the Embankment at any weak point.

10. The work may take some considerable time to finish, but if the convicts are employed in the construction of it, under the superintendence of an Engineer Officer, they will be found pretty competent to the task, and the Jails at Allipore are sufficiently commodious to collect them towards the termination of the rainy season, for the purpose of sending them out in Tents to work during the dry season, the only period of the year when the work can be carried forward.

11. The work when finished, and during its construction, will require the constant, unremitting attention of an Engineer Officer, to prevent the natives from stopping the water Channels for the purpose of taking fish, and for irrigating their Lands; and I would beg to suggest for the consideration of the Honorable Court, that much advantage would be gained if the Superintending Engineer were directed to proceed to Holland for the purpose of inspecting the Embankments in that Country, accompanied by two or three young men who

have qualified for the Engineers at Addiscombe. The two countries are similar in every respect, and the Plans adopted by the Dutch with success to protect Amsterdam, and the whole of Holland from the encroachment of the Sea, cannot but prove most useful to our Engineers in Bengal.

12. The Country between Culpee and Calcutta is a succession of Jheels and Swamps, and in the rains one sheet of water. The outlets of these Jheels and Swamps are connected with the River Hoogly and the Soonderbunds, and it is probable that if attention were paid to Bunding out the High Tides, that much of the Country might be Drained by erecting self-acting Sluices at the outlets of the Jheels and Swamps at low water, and the Lands would then become more healthy, and capable of producing good rice crops.

BRAMDEAN HOUSE, I am, &c.
The 23rd July 1842. *(Signed)* HENRY WOOD.

No. 31. (B)

Ordered—That a copy of the above Letter from the Honorable the Court of Directors and of the Communication from Mr. Henry Wood therein referred to, on the Drainage of Calcutta and protection of the City from Inundation during Spring Tides, be transmitted through the Judicial Department of the Government of Bengal, to the Military Board for information. The Map therein mentioned will be forwarded as soon as received.

A true extract,

CD *(Signed)* W. B BAYLEY,
T. R. *Deputy Secretary to the Government of Bengal.*

No. 32.

(No. 165.)

From the Officiating Deputy Secretary to the Government of Bengal in the Judicial Department,

To THE CHAIRMAN TO THE FEVER HOSPITAL AND MUNICIPAL COMMITTEE.

Dated Fort William, the 9th January 1843.

Judicial Department.

SIR,

With reference to the second paragraph of my Letter No. 27, of the 29th ultimo, I am directed by the Honorable the Deputy Governor of Bengal, to forward to you the accompanying Map* alluded to in Mr. Wood's communication on the Drainage of Calcutta.

* Marked No. 32 (A)—J. M.

I have the honor to be,
Sir,
Your most obedient servant,

FORT WILLIAM,
The 9th January 1843
EXD.
H. Court

(Signed) J. S. TORRENS,
Officiating Deputy Secretary to the Government of Bengal.

No. 33.

No. 999.

TO MAJOR W. N. FORBES, *Engineers,*
Mint Master, &c. &c. &c.

Dear Sir,

I have received the enclosed* Papers from the Government, and have laid them this day before the Committee upon the Fever Hospital and Municipal Improvements. The Committee are desirous of imposing on you the trouble of drawing up a short note upon Mr. Wood's Letter to the Court of Directors, which may enable the Committee to make a satisfactory answer upon the subject to the communication received from the Government, I have therefore the pleasure to enclose the Papers as per margin.

* Viz. Those marked in this Appendix as No. 31, to No. 32(A) inclusive.—J. M.

I am,
Dear Sir,
Most sincerely yours,
(*Signed*) J. P. GRANT,
Chairman, Municipal Committee.

Municipal Office,
Town Hall,
5th April, 1843.

No. 34.

To THE HONORABLE SIR JOHN PETER GRANT,
Chairman, Municipal Committee of Calcutta.

Dear Sir,

I have the honor to acknowledge the receipt of your Letter of date the 5th of April, with its enclosures, regarding a communication from Mr. H. Wood to the Honorable the Court of Directors on the subject of the Drainage of Calcutta, and on the protection of the City from Inundation during the Spring Tides; and in reply to state, that careful examination of the levels of Calcutta and of the country adjacent have induced the conclusion, that the construction of the very extensive and costly work proposed by Mr. Wood; viz. the erection of a Circular Bund or Embankment beyond the Suburbs of the City and along the edge of the Salt Water Lake and other Swamps surrounding the Suburbs, having a height of three feet above the highest level of the highest Tide at Chandpaul Ghaut, is not merely unnecessary for the protection of the population of the Town of Calcutta and of the Suburbs, but that, under the circumstances speculated on by Mr. Wood, chiefly on extraordinary rise of Tide in the River Hoogly, the formation of the Embankment he has proposed could scarcely fail of producing the very effect it was intended to avert.

2nd. In the accompanying Sketch, A. represents the Bank of the River Hoogly, B. Mr. Wood's embankment, or Dam 3 feet higher than A.; C. the centre of the City of Calcutta, of which the *lowest quarter* is 7 feet *higher than the high water level of the Salt Water Lake E. F.*; A. C. D. Site of the city of Calcutta. Now in the case alluded to by Mr. Wood, that of an extreme Spring Tide or Inundation overflowing the River Bank at A., it is obvious that were there, as proposed by him, an Embankment at B. rising three feet higher than the Bank at A, its inevitable effect would be to Dam up the water overflowing

the Bank at A., and consequently to overwhelm the entire site of the city A. C. D. ; and although this effect might be in some degree retarded by the Sluices proposed to be introduced in the Embankment, yet it is evident that under the supposition of the whole River Bank being overflowed, these *Sluices* could but most imperfectly give vent to the water pouring into the City; as further that although nominally made self-acting, they would speedily get choked up by the ruins of the mat and bamboo (straw or leaf thatched) huts constituting the habitations of the great proportion of the population of Calcutta. It in fact is clear, that under the circumstances described, the most effectual method of saving the lives of the inhabitants would be the total removal of the Embankment suggested as the means of their preservation, as this being done, the water overflowing the River Bank would uninterruptedly be able to discharge itself into the Salt Water Lake, which then having a surface of upwards of 40 square miles, and a still lower level of country extending 150 miles to the East-South-East of its Eastern side, would pass *harmlessly off to the ocean* any body of water that (barring a second Deluge) could ever overflow the River Bank.

3rd. With reference to a circumstance above adverted to, the fact of the lowest part of the City of *Calcutta* being upwards of 7 *feet above high-water in the Salt Water Lake,* I have (in a previous report addressed to you) pointed out the means by which (were funds available) the City might be effectually *cleaned and drained;* and I may here observe, that one of the causes of its being at present less perfectly drained, than it might be, is the construction of *Embanked Roads,* some of them running parallel to the line of Embankment proposed by Mr. Wood, and which, by interfering with the free discharge of rain water into the Salt Water Lake, dam it back into localities from which it is only raised by the slow and comparatively unhealthy process of evaporation.

4th. The same principle applies to the Embankment proposed by Mr. Wood around Garden Reach and its vicinity as to that recommended by him around Calcutta and its Suburbs; in both localities the ground immediately adjacent to the River is drained *into it,* but in both the general fall of the surface of the country is from the River Bank to the East-South-Eastward, and of consequence in both cases, the formation of an Embankment necessarily acting as a Dam to interrupt the free discharge of water overflowing the River Bank, would in every respect be inexpedient.

5th. The self-acting Sluices described by Mr. Wood, (in paragraph 8th) as having been erected by Colonel Pearce at the lower end of Garden Reach for the discharge of the rain water falling in the grounds of the houses adjoining the River Bank, and in and around the neighbouring villages, appear *at present* not to be in use; as at Spring Tide the water flows back from the River up the *ditches* on either side of the Garden Reach Road, and overflowing *these,* it in several cases lodges itself in localities, from which it only finds escape by the insalubrious agency of evaporation.

6th. These "self-acting Sluices" ought to be renewed, and made of such capacity, as to pass off during each Ebb Tide, all the rain water falling on the surface intended to be drained by them during the time they would be closed by the Flood Tide.

I have the honor to be,

Sir,

Your most obedient servant,

(*Signed*) W. N. FORBES,

Lieutenant Colonel, Engineers

MINT,

17th October, 1842.

No. 35.

No. 2036.

To J. H. PATTON, ESQ.
Chief Magistrate, &c. &c. &c.

DEAR SIR,

Several propositions relative to New Laws for the better government of the Town of Calcutta were offered by Mr. McFarlan, then the Chief Magistrate, and were transmitted by the Government to the Indian Law Commission, who communicated their opinion regarding the propriety of passing them.

See Addenda to Appendix (F) to the Municipal Committee's Report.

The Government took the letter of the Law Commission into consideration on the 7th February 1838; and upon all of the propositions, except two, the opinion of the Government of India was pronounced.

The two excepted propositions were, a Law for the regulation of Ferry boats plying between Calcutta and the opposite bank of the River, and a Law to prevent the obstruction of Public Ghauts by Boats remaining a long time in front of them. These two points were referred to the Committee of Municipal Improvements, of which you are a Member, for our opinion in regard to the necessity of the first proposed measure, and to the provisions of the Law which, if a Law be called for at all, ought to be enacted upon that matter, and also for the opinion of our Committee upon the 2nd of these proposed Laws relative to the obstructions at the Ghauts.

I am at present engaged in drawing a draft Report of our Committee upon all the matters which remain for us to report upon, of which, I am sorry to say, that very much through my negligence, and partly from my occupations, these two matters form a part.

I am desirous of obtaining first your opinion upon the necessity of any legal enactment in regard to both or either of these subjects.

Secondly, the grounds of your opinion

Thirdly, your opinion on the sort of investigation which it would be right for the Committee to institute, in order to report upon these matters.

Fourthly, whether any old Bye-laws or Regulations exist, or any Laws have been passed since the date of the above Resolution regarding them ; and,

Lastly, any other observation upon the subject with which you may think fit to favor me.

I have addressed you this letter, thinking that you may possibly prefer giving me your opinion in writing to stating it verbally at a Meeting of the Committee.

It is my intention to assemble the Committee as soon as possible after the close of the ensuing Criminal Sessions, which will probably be in about a fortnight ; and if you prefer stating your opinion verbally to the Committee, it will equally answer my purpose, but I think the Committee must have the benefit of your opinion as Chief Magistrate, to enable them to report upon the questions, or to institute a suitable inquiry.

I have the honour to be,
Dear Sir,
Your most obedient and humble servant,
(*Signed*) J. P. GRANT,
Chairman of the Committee upon Municipal Improvements

MUNICIPAL OFFICE,
12th June, 1845.

No. 36.

(No. 302.)

To THE HON'BLE SIR J. P. GRANT, Kt. M. A.

Chairman to the Committee upon Municipal Improvements, Calcutta.

Honorable Sir,

I have the honor to acknowledge the receipt of your letter of the 13th instant, requesting my opinion on certain points referred by Government for the consideration of the Committee of Municipal Improvements, relating to a proposed Law for the regulation of Ferry boats plying between Calcutta and the opposite bank of the River, and a Law to prevent the obstruction of public Ghauts by boats remaining a long time in front of them.

2nd. I shall proceed to make such observations as occur to me in the order observed in your letter.

1stly. With regard to the first subject, viz., the Regulation of Ferry boats, I am decidedly of opinion that a legal enactment is both proper and necessary.

2ndly. My reason for entertaining such an opinion, is the frequent accidents that occur on the River, attended in many cases with extensive loss of life, from the overloaded state of Ferry boats, their being ill provided with boat-gear, and the inefficient manner in which they are ordinarily manned ; but the principal cause of these accidents is generally owing to their being overcrowded. The prevention of this evil seems to me to be the primary object that demands attention, and for this purpose it appears necessary that there should be particular Ghauts fixed for Ferry boats, and that these boats should be numbered and registered, together with the name of the owner. The capabilities of each boat, as regards the number of men it is calculated to hold with safety, should be carefully ascertained, and this number, as well as that of the register number, should be painted in legible characters in some conspicuous part of the boat.

3rdly. The sort of investigation which I think it would be proper to institute in order to report upon the questions referred to me, should be the oral examinations of those who frequent the River, and thus have opportunities of witnessing the accidents, that commonly occur, and might offer useful suggestions on the subject. Such persons, I presume, might be found in the Master Attendant's and Harbour Master's Departments, and among the Inspectors of Customs and the better class of Preventive Officers.

4thly. I am not aware of the existence of any old Bye-Laws or Regulations, or any Laws that have been passed since the date of the Resolutions of the Government you allude to, the 7th February 1838, that have reference to the matters in question.

5thly. Nothing further occurs to me at present worthy of suggestion. I shall be happy to assist the Committee in arranging the details of Registry and other matters connected with the proposed measure.

3rd. With reference to the obstruction of the public Ghauts, and the means of preventing it, I am of opinion that the proposed Law would be highly desirable, although it may be questionable whether the Government would consent to bear the expense that will be incidental to its efficient working. As regards the Ferry boats, the registry fees, however small, that it will be necessary to impose, will go to cover the expenses that the carrying out of the Law would entail ; but as respects the proposed Law for the prevention of obstructions there can be no income, and the State will have to bear all charges of establishment, &c. that will be necessary for the purpose.

4th. At present no distinctions exist as to what Ghauts are public, and what are not. The whole face of the River as far as the Strand Road extends, is commonly used by the Public, and no question arises as regards the right of way.

I have the honour to be, Honorable Sir,
Your most obedient servant,
J. H PATTON, *Chief Magistrate.*

Calcutta Police Office,
26th June, 1845.

No. 37.

Extract—Military Board's Proceedings, 27th October 1835.

Summary of the Expense of constructing the Sunderbun Canal from its commencement in 1823-24 *to* 1st *May* 1835.

Year.	Purchase of Ground.	Excavation, embankments, earth work in general, clearing jungle, &c.	Dredging and deepening.	Masonry, bridges, drains.	Locks, lock gates, dams, wood-work.	Cleaning tow paths.	Establishment and contingencies.	Superintendent's salary.	Stores received from the Magazine.	Grand Total.
1823-4	....	31,162 6 6½	30,807 11 3	....	....	....	7,778 12 7	11,000 0 0	1,448 11 0½	82,197 9 5
1824-5	....	18,395 0 0	564 6 11	....	....	....	5,076 1 11	9,000 0 0	....	33,035 8 10
1825-6	Work,	Suspended,	....	....	....	....	The establisht.	....	....	....
1826-7	....	6,411 13 6¼	2,674 2 10	....	415 10 6½	....	for these years is	3,500 0 0	....	13,001 10 10¾
1827-8	....	29,621 8 8	15,640 15 0½	835 3 5	15,704 3 3½	....	included in the	6,000 0 0	....	67,801 14 5
1828-9	....	50,807 14 11¼	13,504 3 8¾	....	1,711 13 7¾	....	general charges	3,000 0 0	....	69,024 0 3¼
1829-30	....	30,950 1 2¼	7,540 7 8	....	....	....	of the Canal.	2,462 4 3¾	....	40,952 13 2
1830-31	....	2,818 14 7¼	2,814 5 3	....	....	....	324 11 2½	1,524 11 11¼	....	7,482 11 0½
1831-32	....	7,886 5 8	....	....	....	....	715 0 2½	1,435 5 6	....	10,036 11 4½
1832-33	....	....	....	95 6 0	....	....	1,085 5 3	1,414 15 5½	....	2,595 10 8½
1833-34	....	442 14 7	....	....	....	....	1,316 9 9½	861 3 3½	....	2,620 11 8
1834-35	....	411 3 1½	....	....	....	813 7 8	2,815 11 9½	861 3 3½	....	4,301 9 10½
	Total, ...	1,78,908 2 10	73,546 4 8¼	930 9 5	17,831 11 5¾	813 7 8	19,112 4 9	41,059 11 10	1,448 11 0½	3,33,650 15 8½

EDWD. SANDERS,

Officiating Secretary, Military Board.

No. 38.

Statement shewing the proportion of Establishment charges borne by the different branches of the Canals under the Superintendent of the Canals.

	Proportion of the charges.	The Superintendent's salary.	Permanent establishment.	Average of contingent charges.	Establishment specified for the locks.	Steam Dredger establishment.	Steam Dredger probable amount of repair and contingent charges.	Monthly Total.	Yearly Total.
Circular Canal, ...	$\frac{2}{10}$ 0 0	57 6 $7\frac{4}{10}$	27 3 $2\frac{4}{10}$	10 0 0	* 147 0 0	89 3 $2\frac{4}{10}$	142 12 $9\frac{6}{10}$	*473 9 $9\frac{8}{10}$	*5,683 5 $9\frac{6}{10}$
Baliaghatta ditto, ...	$\frac{1}{10}$ 0 0	28 11 $3\frac{7}{10}$	13 9 $7\frac{2}{10}$	5 0 0	0 0 0	41 9 $7\frac{2}{10}$	71 6 $4\frac{8}{10}$	163 4 $10\frac{9}{10}$	1,959 10 $10\frac{8}{10}$
Entally ditto, ...	$\frac{1}{10}$ 0 0	28 11 $3\frac{7}{10}$	13 9 $7\frac{2}{10}$	5 0 0	0 0 0	41 9 $7\frac{2}{10}$	71 6 $4\frac{8}{10}$	163 4 $10\frac{9}{10}$	1,959 10 $10\frac{8}{10}$
Tolly's Nullah, ...	$\frac{2}{10}$ 0 0	57 6 $7\frac{4}{10}$	27 3 $2\frac{4}{10}$	10 0 0	0 0 0	89 3 $2\frac{4}{10}$	142 12 $9\frac{6}{10}$	326 9 $9\frac{8}{10}$	3,919 5 $9\frac{6}{10}$
Lake Channel, ...	$\frac{1}{10}$ 0 0	28 11 $3\frac{7}{10}$	13 9 $7\frac{2}{10}$	5 0 0	0 0 0	44 9 $7\frac{2}{10}$	71 6 $4\frac{8}{10}$	163 4 $10\frac{9}{10}$	1,959 10 $10\frac{8}{10}$
Sunderbun Canals, ...	$\frac{3}{10}$ 0 0	86 1 $11\frac{1}{10}$	40 12 $9\frac{6}{10}$	15 0 0	0 0 0	133 12 $9\frac{6}{10}$	214 3 $2\frac{4}{10}$	489 14 $8\frac{7}{10}$	5,879 0 $8\frac{4}{10}$
Monthly Totals,....	$\frac{10}{10}$ 0 0	†287 1 1	136 0 0	50 0 0	147 0 0	446 0 0	714 0 0	1,780 1 1	.....
Yearly ditto.	1×12 0 0	3,444 13 0	1,632 0 0	600 0 0	1,764 0 0	5,352 0 0	8,568 0 0		21,360 13 0

* The charge for the Locks, 147 Rs. monthly, or Rs. 1,764 annually, is included in the establishment maintained for the Circular Canal only, as the Locks are situate on that line; but as closing one end of the whole line of communication which reaps an equal advantage from their operation, the charge might perhaps be more fairly distributed on the Circular and Baliaghatta Canals and Lake Channel.

† Half of Captain Thomson's salary, the other half being charged to the Iron Suspension Bridge Department.

EDWD. SANDERS,

Secretary, Military Board.

Extracts—Military Board's Proceedings, 27th October 1835, marked Nos. 37 to 43, inclusive.—(Continued.)

Summary of the Expense of Constructing the Circular Canal from its commencement in 1823-24 to 1st May, 1835.

Years.	Purchase of ground.	Excavation, embankments, earth-work in general, clearing jungle, &c.	Dredging and deepening.	Masonry, bridges, drains.	Lock, Lock-gates, dam, and wood-work.	Road along the Canal.	Establishment & contingencies.	Superintendent's salary.	Cost of Iron work from Suspension Bridge Department.	Grand Total.
1823-4	91,774 0 0	....	....	....	....	....	....	....	....	91,774 0 0
1824-5	1,19,760 14 0	....	....	....	....	....	....	....	....	1,19,760 14 0
1825-6	22,172 8 0	....	....	....	....	....	....	....	....	22,172 8 0
1826-7	42,657 0 0	....	....	....	....	....	....	....	....	42,657 0 0
1827-8	89,925 13 10	....	....	....	....	....	....	....	....	89,925 13 10
1828-9	3,36,034 9 10	13,360 9 5¾	....	....	....	....	Included in the general charges of excavation, &c.	6,000 0 0	....	4,05,395 3 3¾
1829-30	45,169 3 9	69,156 3 4¾	....	....	....	....		4,924 8 7½	20,107 2 11½	1,39,357 2 8¾
1830-1	91,971 3 0	59,072 1 3	....	....	....	....	649 6 5	3,049 7 11½	....	1,54,742 2 7½
1831-2	22,055 8 4	22,953 5 4¾	....	38,002 8 2¾	....	3,459 14 9	1,430 0 5	2,870 11 0	28,829 1 10	1,19,592 1 11½
1832-3	40,023 1 7	8,291 13 3¾	5,062 2 11	10,092 15 3¼	21,395 15 1¾	20,860 4 0	2,170 10 5¾	3,021 4 11	340 8 7	1,11,261 12 2½
1833-4	5,106 4 0	1,698 0 2¾	5,893 13 10	4,701 5 8½	4,017 12 9	6,779 7 1½	2,633 3 7	4,880 2 9	75 15 2	35,786 0 8¾
1834-5	....	12,864 14 7	....	6,667 1 8	69,997 12 ¼	13,550 1 7½	5,631 7 7	1,722 6 7	615 3 8	1,11,048 15 8¾
	9,56,650 2 4	1,87,399 15 7¾	10,956 0 9	59,463 14 5½	95,411 7 11	44,645 11 6	12,514 12 5¾	26,468 9 10	49,958 0 2½	14,43,473 11 1½

EDWARD SANDERS.
Secretary, Military Board

No. 40.

Statement of the Canal Committee's Office Establishment.

	Secretary's salary and office rent.	Office establishment & contingent charges.	Total of each year.
1822-23, ...	250 0 0	....	280 0 0
1823-24, ...	3,600 0 0	4,852 0 0	8,452 0 0
1824-25, ...	3,600 0 0	5,764 9 11	9,364 9 11
1825-26, ...	3,600 0 0	6,324 0 0	9,924 0 0
1826-27, ...	3,600 0 0	6,324 0 0	9,924 0 0
1827-28, ...	3,600 0 0	6,324 0 0	9,924 0 0
1828-29, ...	3,600 0 0	6,324 0 0	9,924 0 0
1829-30, ...	3,600 0 0	6,324 0 0	9,924 0 0
1830-31, ...	2,300 0 0	4,012 0 0	6,312 0 [illegible]
	27,780 0	46,248 10 0	74,028 10 0

EDWARD SANDERS.
Secretary, Military Board.

No. 41.

Statement exhibiting the Receipts of the amount of Tolls at the Chowkey on the New Circular Canal and Entalee Canal.

	Amount of Tolls, Circular Canal.		Amount of Tolls, Entalee Canal.		Grand Total.
	Rs. As. Gs.	Rs. As. Gs.	Rs. As. Gs.	Rs. As. Gs.	
1831.					
From 23rd to 30th November,	32 13 15		1,583 15 12		
December, ...	73 6 8		1,089 10 0		
1832.					
January, ...	48 5 9		1,175 15 5		
February, ...	52 15 19		1,294 9 17		
March, ...	81 0 13		1,319 9 5		
April, ...	104 10 12	393 4 16	1,288 7 0	7,752 2 19	8,145 7 15
May, ...	107 10 15		1,252 13 12		
June, ...	88 15 1		1,299 12 6		
July, ...	124 13 13		1,331 9 18		
August, ...	122 7 17		1,168 15 9		
September, ...	121 0 4		1,354 6 1		
October, ...	89 4 5		1,640 2 5		
November, ...	44 12 10		1,685 5 8		
December, ...	40 15 10		1,114 4 17		
1833.					
January, ...	48 11 10		1,185 3 16		
February, ...	73 10 15		1,171 13 8		
March, ...	114 7 13		1,343 8 16		
April, ...	74 2 7	1,051 0 0	1,296 9 0	15,844 8 16	16,895 8 16
May, ...	74 3 7		1,435 1 5		
June, ...	85 8 3		1,318 2 3		
July, ...	89 7 17		1,316 15 14		
August, ...	155 15 8		1,208 13 13		
September, ...	162 4 14		1,366 12 3		
October, ...	149 3 1.1		1,673 0 1		
November, ...	125 4 8		1,514 7 9		
December, ...	60 13 3.1		1,249 1 10		
1834.					
January, ...	....		1,201 10 3		
February, ...	....		1,182 11 9		
March, ...	27 7 10		1,380 8 19		
April, ...	117 5 17	1,047 9 8.2	1,352 7 16	16,199 12 5	17,247 5 13.2
May, ...	120 11 2		1,465 5 1		
June, ...	87 5 10		1,329 9 8		
July, ...	114 1 0		1,358 13 11		
August, ...	61 1 0		1,213 2 14		
September, ...	151 3 10		1,389 13 4		
October, ...	138 4 15		1,726 15 9		
November, ...	161 5 5		1,552 10 2		
December, ...	125 15 10		1,460 7 12		
1835.					
January, ...	92 15 10		1,440 3 3		
February, ...	179 6 0		1,312 5 4		
March, ...	191 0 5		1,408 11 11		
April, ...	205 3 0	1,628 8 7	1,552 13 4	17,210 14 3	18,839 6 10
		4,120 6 11.2		57,007 6 3	61,127 12 14.2

EDWARD SANDERS,

Secretary, Military Board.

No. 42.

Table shewing the Number of Boats that have passed through the Circular Canal, during the undermentioned period.

Months.	Number of boats in 1833-4.	Number of boats in 1834-5.	Number of boats in 1835-6.	Total number of boats.
May, ...	....	737	1,230	1,967
June, ...	....	682	1,302	1,984
July, ...	733	764	....	1,497
August, ...	1,347	848	....	2,195
September, ...	1,297	968	....	2,265
October, ...	1,287	1,215	....	2,502
November, ...	1,441	955	....	2,396
December, ...	512	718	....	1,230
January, ...	....	1,378	....	1,378
February, ...	....	1,805	....	1,805
March, ...	142	1,575	....	1,717
April, ...	609	1,614	....	2,223
	7,368	13,209	2,532	23,109

EDWARD SANDERS,
Secretary, Military Board.

No. 43.

Statement of Rents collected by the Aumeen from Tenants occupying the surplus lands along the Circular Canal.

Collected in the year 1832-3, ...	1,318	9	4
Ditto ,, Ditto 1833-4, ...	912	0	0
Ditto ,, Ditto 1834-5, ...	1,326	14	2
Total Sicca Rupees, ...	3,557	7	6

EDWARD SANDERS,
Secretary, Military Board.

No. 44.

Extract—Military Board's Proceedings, 26th January 1844.

No. 125.

FROM THE MILITARY BOARD,

TO THE HONORABLE W. W. BIRD, ESQ.

Deputy Governor of Bengal.

Letter No. 32, of the 11th April last, from the Officiating Secretary Board of Revenue, with accompaniments.
Letter No. 1885, of the 23rd November last, from Lieutenant Colonel Garstin, with accompaniments.

Revenue Department.

HONORABLE SIR, *Fort William, 9th May,* 1843.

With reference to Mr. Secretary Halliday's Letter, Nos. 1257 and 1258, both dated the 10th October 1842, we have the honor to submit the original papers noted on the margin, and also to append the following statements of the realizations made by Tolls on the Calcutta Canals and the Nuddea Rivers, during the periods mentioned therein, and the total expenditure incurred on these streams.

A.

Balleeaghatta and Circular Canals and Tolly's Nullah.

Years.		Expenses for improving Navigation, &c. including Superintendent's salary and establishment.	Expenses on account of Toll collections.	Toll. Total Expenditure.	Gross Collections.	Surplus.
804-5 to 1835-6, and from May to November, 1836.	As per Statement furnished by the Accountant General, through the Sudder Board of Revenue.	90,870 11 3	2,45,421 11 8	3,36,292 6 11	27,22,721 6 5	23,86,428 15 6
1836-37 to 1841-42.	As per Statement prepared in the Board's Office.	1,52,382 13 5	46,320 15 4	1,98,703 12 9	7,91,864 6 3	5,93,160 9 6
	Total amount Rs. ..	2,43,253 8 8	2,91,742 11 0	5,34,996 3 8	35,14,585 12 8	29,79,589 9 0

B.

Nuddea River.

Years.		Expenses for improving Navigation, &c. including Superintendent's salary and establishment.	Expenses on account of Toll collections.	Total Expenditure.	Gross Collections.	Surplus.
1824-25 to 1829-30.	As per Statement furnished by the Accountant General.	2,13,342 10 11	1,04,076 15 3	3,17,419 10 2	5,70,120 3 0	2,52,700 8 10
1830-31 to 1839-40.	As per ditto, by Captain Smyth, vide Proceeding, 9th Feb. 1841.	3,28,397 3 10	1,48,712 6 4	4,77,109 10 2	15,97,289 5 9	11,20,179 11 7
1840-41 and 1841-42.	Ditto, ditto, ditto.	53,119 14 10	35,456 14 6	88,576 13 4	4,52,465 9 6	3,63,888 12 2
	Total amount Rs. ..	5,94,859 13 7	2,88,246 4 1	8,83,106 1 8	26,19,875 2 3	17,36,769 6 7

2nd. With regard to Statement A. we beg to observe, that the cost of excavating the Circular Canal and constructing Bridges, which is Rupees 14,43,473 : 11 : 1¼, and the Sunderbund Canal, Rs. 3,33,650 : 15 : 8½, as well as that for Tolly's Nullah and the Balleahghatta Canal (which is not known to us), is not shewn in this Statement.

3rd. We propose to suspend our opinion on the subject of changes in the rules for collecting Tolls on the Nuddea Rivers, until Captain Smyth shall have furnished us with a Report on the subject, as promised in the 10th Paragraph of his Letter, No. dated the 27th March last, an Extract of which is hereunto annexed.

We have, &c.

(*Signed*) J. H. PATTON, *Chief Magistrate.*

REVENUE DEPARTMENT, „ J. CHEAPE, *Lieut.-Colonel, Chief Engineers.*

FORT WILLIAM, „ T. M. TAYLOR, *Lieutenant-Colonel.*

9th May, 1843. „ A. IRVINE, *Major.*

No. 44. *a.*

No. 32.

FROM THE OFFICIATING SECRETARY, SUDDER BOARD OF REVENUE,

TO THE SECRETARY TO THE MILITARY BOARD.

SIR,

In continuation of Letter, No. 12, dated the 24th January last, I am directed by the Sudder Board of Revenue to transmit herewith* four original Statements, prepared in the Office of the Accountant General, conveying the particulars called for in your Letters, Nos. 3739 and 3740, both dated 24th October last.

No. 33. Miscellaneous Department, Present J. Lowis, Esq.

* Marked No. 44. *a.* No. 44. *a* (1) to No. 44. *a.*(4) inclusive.—J. M.

I have the honor to be,

Sir,

Your most obedient servant,

(*Signed*) GEO. PLOWDEN,

Officiating Secretary.

SUDDER BOARD OF REVENUE,
FORT WILLIAM,
The 4*th April,* 1843.

Copied by G. R.
Compared, W. PALMER.

No. 44. *a.*[1]

Statement of Collections and Expenditure on the Balliaghatta New Canal, from the year 1810-11 *to* 1835-36, *and from May to Nov.* 1836.

	Expenses for improving the navigation, including the Superintendent's salary and establishment.	Expenses on account of Toll Collections.	Total Expenditure.	Gross Collections.	Surplus.
1810-11, ...	....	862 6 5	862 6 5	2,902 0 0	2,039 9 7
1811-12, ...	....	1,729 1 7	1,729 1 7	6,075 0 0	4,345 14 5
1812-13, ...	620 7 1	1,863 12 0	2,484 3 4	11,394 11 8	8,910 8 1
1813-14, ...	59 4 3	2,051 11 9	2,111 0 0	11,435 14 5	9,324 14 5
1814-15, ...	542 4 0	2,540 8 2	3 082 12 2	12,237 0 0	9,154 3 10
1815-16, ...	....	2,129 4 0	2,129 4 0	13,071 0 0	10,941 12 0
1816-17, ...	700 0 0	2,160 3 5	2,860 3 5	14,633 11 7	11,773 8 2
1817-18, ...	....	2,210 5 6	2,210 5 6	15,963 13 0	13,753 7 6
1818-19, ...	....	2,164 11 0	2,164 11 0	17,191 11 5	15,027 0 5
1819-20, ...	796 0 0	2,310 10 9	3,106 10 9	18,107 15 5	15,001 4 8
1820-21, ...	....	2,302 0 11	2,302 0 11	17,686 4 4	15,384 3 5
1821-22, ...	874 6 0	2,282 9 4	3,156 15 4	17,674 12 5	14,517 13 1
1822-23, ...	....	2,281 0 3	2,281 0 3	17,622 6 9	15,341 6 6
1823-24, ...	....	2,277 11 9	2,277 11 9	16,546 12 11	14,269 1 2
1824-25, ...	....	2,225 12 11	2,225 12 11	16,896 12 1	14,670 15 2
1825-26, ...	....	2,255 8 3	2,255 8 3	17,115 8 0	14,859 15 9
1826-27, ...	....	2,192 12 9	2,192 12 9	14,803 14 2	12,611 1 5
1827-28, ...	....	2,200 7 9	2,200 7 9	17,002 1 5	14,801 9 8
1828-29, ...	....	2,256 12 7	2,256 12 7	17,141 10 10	14,884 14 3
1829-30, ...	....	2,267 2 4	2,267 2 4	17,322 4 11	15,055 2 7
1830-31, ...	150 0 0	2,272 7 1	2,422 7 1	17,503 13 3	15,081 6 2
1831-32, ...	....	2,262 2 3	2,262 2 3	17,514 2 6	15,282 0 3
1832-33, ...	....	2,331 15 0	2,331 15 0	18,083 4 11	1,5751 5 11
1833-34, ...	....	2,394 5 0	2,394 5 0	18,287 14 3	15,893 9 3
1834-35, ...	510 0 0	2,429 4 7	2,939 4 7	19,354 4 10	16,415 0 3
1835-36, ...	....	2,364 0 5	2,364 0 5	25,841 12 5	23,477 12 0
From May to November, 1836.	....	2,196 10 8	2,196 10 8	19,402 2 9	17,205 8 1

FORT WILLIAM,
ACCOUNTANT GENERAL'S OFFICE,
REVENUE DEPARTMENT,
The 4th April, 1843.

Errors Excepted,
(Signed) C. MORLEY,
Accountant General.

(Signed) FRED. EDWARD PORTEOUS,
Officiating H A

Examined, NUBOKISSEN SEAT.

No. 44. *a.*[2]

***Statement of Collections and Expenditure on Tolly's Nullah, from the year* 1804-5 *to* 1835-36, *and from May to November*, 1836.**

	Expenses for improving the navigation, including the Superintendent's salary and establishment.	Expenses on account of Toll Collections.	Total Expenditure.	Gross Collections.	Surplus.
1804-5, ...	....	2,432 2 1	2,432 2 1	48,490 9 7	46,058 7 6
1805-6, ...	....	3,104 0 0	3,104 0 0	37,658 15 8	34,551 15 8
1806-7, ...	....	2,512 0 0	2,512 0 0	60,063 4 0	57,521 4 0
1807-8, ...	61,650 2 2	3 708 0 0	65,358 2 2	69,762 0 0	4,403 13 10
1808-9, ...	....	3,708 0 0	3,708 0 0	73,874 6 4	70,166 6 4
1809-10, ...	....	3,708 0 0	3,708 0 0	78,700 8 4	74,992 8 4
1810-11, ...	....	3,708 0 0	3,708 0 0	71,683 15 0	67,975 15 0
1811-12, ...	....	3,708 0 0	3,708 0 0	60,299 14 0	56,591 14 0
1812-13, ...	....	3,708 0 0	3,708 0 0	66,023 0 0	62,315 0 0
1813-14, ...	....	4,883 14 8	4,883 14 8	62,885 2 0	58,001 3 4
1814-15, ...	114 0 0	9,224 15 0	9,338 15 0	64,795 0 0	55,456 1 0
1815-16, ...	228 0 0	6,910 5 7	7,138 5 7	63,422 1 5	56,283 11 10
1816-17, ...	494 0 0	6,817 10 1	7,311 10 1	67,211 13 9	59,900 3 8
1817-18, ...	570 0 0	6,673 15 2	7,243 15 2	72,425 6 2	65,181 7 0
1818-19, ...	806 0 0	6 899 13 3	7,705 13 3	89,596 15 6	81,891 2 3
1819-20, ...	370 0 0	7,844 2 5	8,214 2 5	88,401 8 6	80,187 6 1
1820-21, ...	2,238 7 8	7,382 12 10	9,621 4 6	78,495 6 3	68,874 1 9
1821-22, ...	456 0 0	6,991 0 3	7,447 0 3	76,010 13 11	68,563 13 8
1822-23, ...	10,965 13 0	6,511 10 11	17,477 7 11	67,739 2 6	50,261 10 7
1823-24, ...	1,063 10 10	6,412 2 11	7,475 13 9	67,351 13 3	59,875 15 6
1824-25, ...	....	6,529 10 8	6,529 10 8	68,708 15 1	62,179 4 5
1825-26, ...	....	6,722 0 1	6,722 0 1	81,259 13 7	74,537 13 6
1826-27, ...	....	7 262 11 8	7,262 11 8	83,593 0 1	76,330 4 5
1827-28, ...	....	7,295 12 5	7,295 12 5	83,932 4 3	76,636 7 10
1828-29, ...	....	6,974 7 0	6,974 7 0	81 589 4 6	74,614 13 6
1829-30, ...	....	7,057 11 7	7,057 14 7	66,416 15 10	59,359 1 3
1830-31, ...	....	6,426 1 10	6,426 1 10	65,812 13 6	59,386 11 8
1831-32, ...	....	6,166 5 11	6,166 5 11	66,424 8 6	60,258 2 7
1832-33, ...	....	6,314 9 0	6,314 9 0	66,523 15 6	60,209 6 6
1833-34, ...	....	6,436 15 4	6,436 13 4	66,815 12 6	60,378 13 2
1834-35, ...	95 12 0	6,607 6 3	6,703 2 3	70,386 9 6	63,683 7 3
1835-36, ...	450 6 0	5,684 4 6	6,134 10 6	61,789 5 1	55,654 10 7
From May to November, 1836	....	249 8 10	249 8 10	16,875 9 8	46,626 0 10

FORT WILLIAM,
ACCOUNTANT GENERAL'S OFFICE,
REVENUE DEPARTMENT,
The 4th April, 1843.

Errors Excepted,
(Signed) C. MORLEY,
Accountant General.

(Signed) FRED. EDWARD PORTEOUS,
Officiating H. A.

Examined, NUBOKISSEN SEAT.

No. 44. *a.*(3)

No. 34.

Statement of Collections and Expenditure on the Eastern or Circular Canal, from the year 1830-31 *to* 1835-36, *and from May to Nov.* 1836.

	Expenses for improving the navigation, including the Superintendent's salary and establishment.	Expenses on account of the Toll Collections.	Total Expenditure.	Gross Collections.	Surplus.
1831-32, ...	....	....	....	393 5 0	393 5 0
1832-33, ...	....	....	....	755 6 1	755 6 1
1833-34, ...	....	....	....	886 4 10	886 4 10
1834-35, ...	....	....	....	2,558 12 0	2,558 12 0
1835-36, ...	7,116 2 0	....	7,116 2 0	3,931 7 11	Excess charges. 3,184 10 1
From May to November 1836.....	....	....	....	10,333 10 7	10,333 10 7

Fort William,
Accountant General's Office,
Revenue Department,
The 4th April, 1843.

Errors Excepted,
(Signed) C. MORLEY,
Accountant General.

No. 44. *a.*(4)

No. 35.

Statement of Collections and Expenditure on the Nuddea Rivers, from the year 1824-25 *to* 1829-30, *and for May* 1830.

	Expenses for improving the navigation, including the Superintendent's salary and establishment.	Expenses on account of Toll Collections.	Total Expenditure.	Gross Collections.	Surplus.
1824-25, ...	445 7 6	16,161 7 6	16,606 8 9	3,518 10 0	13,087 14 9
1825-26, ...	44,333 10 6	8,366 10 3	52,700 4 9	68,625 13 6	15,925 8 9
1826-27, ...	29,839 3 5	14,236 2 1	44,075 5 6	1,10,727 7 4	66,652 1 10
1827-28, ...	35,786 10 11	13,868 3 4	49,654 14 3	1,15,779 0 11	66,124 2 8
1828-29, ...	13.295 0 0	39,303 4 8	52,598 4 8	1,29,025 6 10	76,427 2 2
1829-30, ...	89,642 10 7	12,141 9 8	1,01,784 4 3	1,42,443 12 5	40,669 8 2
May 1830, ...	3,303 8 0	473 6 9	3,776 14 9	4,705 9 11	928 11 2

Fort William,
Accountant General's Office,
Revenue Department,
The 4th April, 1843.

Errors Excepted,
(Signed) C. MORLEY,
Accountant General.

No. 44. *b.*

No. 1885.

FROM LIEUTENANT-COLONEL E. GARSTIN,
Superintending Engineer, L. P.

TO MAJOR H. DEBUDE,
Secretary, Military Board.

SIR,

Agreeably to the instructions conveyed in your Letter, No. 3741, of the 24th October 1842, I have the honor to enclose a Statement of the Collections and Expenditure on the Nuddea Rivers, from the 1st May 1840 to the 30th April 1842, accompanied by an original Letter, No. 254, of the 15th November instant, from the Superintendent, Captain W. M. Smyth, on the subject. Tolls

2nd. As I have in my Letter, No. 1884, of this date, recommended a revision of the manner of levying the Tolls, and regulations regarding them, it is unnecessary to say any thing on the subject here.

3rd. In regard to Captain Smyth's suggested Canal, I can say nothing until the question shall be submitted, with Plans, Sections and Estimates; for even if feasible at present, according to his showing doubtful, it might not, for other reasons, be advisable.

I have the honor to be,
Sir,
Your obedient servant,
(Signed) E. GARSTIN, *Lieut. Colonel,*
Superintending Engineer, L. P.

BARRACKPORE,
23rd November, 1842.

No. 44. *b.* (1)

No. 254.

LIEUTENANT-COLONEL E. GARSTIN,
Superintending Engineer, L. P.

SIR,

I have the honor to enclose the Statement called for in your Letter, No. 1585, of the 26th ultimo, and I trust that the result shown may be deemed satisfactory.

2nd. There is a surplus of receipts over expenditure in the last two years, which amounts to Rupees 3,63,888 : 12 : 13¼, and it is to be expected that this surplus, though it will fluctuate with the traffic of the country, will not be less than 1,50,000 Rupees per annum, whilst, on the other hand, it may increase considerably.

3rd. Upon the subject of this Toll, I would remark, that the amount collected upon the Bhaugiruttee has increased three-fold since 1824, when it was established—notwithstanding two reductions in the rates, the first (published in the Government Gazette of the 15th January 1834,) was on Bamboos and Timbers; the second (published on the 6th September 1837,) was a general reduction of 25 per cent. upon all Tolls leviable.

4th. The great increase in the receipts tends to prove, that the impost which indeed falls very lightly upon Merchandize, has not been prejudicial to traffic, whilst the charge for collection under the present system is only 8 per cent., as will be seen by an inspection of the statement now submitted.

5th. The reduction of 1834, extended to the Jellinghee and Matabanga Rivers; the further reduction of 25 per cent. was confined to the Bhaugiruttee; and it is due to Mr. Larruleta, the present Collector on the Bhaugiruttee, to remark, that under his management the receipts from the Toll increased so considerably as to induce the reduction to the Jellinghee and Matabanga Rivers—it ought to be ascertained whether it might not be made so as to facilitate the measurements and calculations.

6th. On the subject of improvement to the Navigation, I would remark, that the sum expended, as shown in the statement, may be considered as a minimum, having been limited to the construction of Bandahls for contracting the Stream, to the removing of trees and other obstructions from the bed and banks of the Rivers, and maintaining an establishment to superintend these works, necessarily extensive, as it requires to be so posted that within a few days, work can be commenced on any point, on a line of 400 miles of River.

7th. The works may, I think, be considered successful on the whole, for the Bhaugiruttee remained navigable throughout the two past years for Boats drawing three feet of water, although the Jellinghee and Matabangah were closed from March.

8th. The Jellinghee closed sooner last year than the previous one, and I had intentionally limited the works; it is only by means of actual experiments that a confident opinion can be given of the success or otherwise which attend the endeavours to improve the navigation.

9th. The River Matabangah is always obstructed by shoals for about 16 miles, viz. from Boleah, where the waters flow off down the Pangassee to Katchikatta. The distance in a direct line is only $6\frac{3}{4}$ miles. An attempt made last year at a small expense of Rs 287 : 2 : 6 to turn the water from the Pangassee down the Matabangah failed, as I apprehended that it would, and that attempts on a larger scale would have done likewise. But it might be possible to keep open the communication on this part of the River for Boats of 5 or 600 maunds, by a Canal cut from the Matabangah above the entrance of the Pungassee, (and the shoals formed as above mentioned), the Canal to rejoin the main Channels in deep water below the shoals. After obtaining data, I shall submit the subject for further consideration; I may however describe the rough design. I should propose to give the least possible fall to the Canal, and to keep up its level at the terminus from 6 to 8 feet above the water in the Matabangah, into which River the vessels must pass over a dam, so to speak, on an inclined railway, riding on a car or upon rollers; the flat bottom of all Country Boats making this practicable. The Canal to be closed in the rains. The objections to the undertaking are many. The difficulty of digging a Canal in the loose soil to be met with, and the tendency it will have to fill up, both by the deposit carried in the water, and by the soil that will constantly exude from the sides?—The Canal could not be scoured, and would require to be cleared out every year by manual labour or by Dredging Boats. It is questionable whether, with a small fall, sufficient water would be supplied from the River to provide for the great leakage.

10th. If any general improvement, such as that now referred to, could be undertaken with a chance of success, the Tolls on the present scale supply ample funds.

I have the honor to be,

Sir,

Your most obedient servant,

JUNGYPORE,
15th November, 1842.

(Signed) WILLIAM M. SMYTH, *Captain, Engineers,*
Superintendent Nuddeah Rivers.

No. 44. *b.*(1¼)

Abstract of the Letter.

PARA. 1. Encloses statement called for in Letter, No. 1585, of the 26th October 1842.
,, 2. States probable fluctuation of Tolls, with the Traffic.
,, 3. The amount collected in the Bhagiruttee has increased three-fold, notwithstanding two reductions.
,, 4. Increase tends to prove, that the Tolls do not check traffic, whilst the charge for collection is small.
,, 5. The reduction of 1834, only extended to the Jellinghee and Matabangah. If it be proposed to extend that of 1837, it ought to be considered whether calculations could not be facilitated.
,, 6. Expence for improvements may be considered a minimum.
,, 7. Considered on the whole successful.
,, 8 Jellinghee closed sooner last year. Works limited for the sake of experiment.
,, 9. Portion of Matabangah that is obstructed, a rough project for a short Canal.
,, 10. Ample funds for such improvements, if any could be undertaken with chance of success.

No. 44. *b.*(1½)

Statement of Collections and Expenditure on the Nuddeah Rivers, from the 1st May 1840, to the 30th April 1842.

	Expense for improving Navigation, &c. including Superintendent's salary and establishment.	Expense on account of Toll Collections.	Total Expenditure.	Gross Collections.	Surplus.
From 1st May 1840, to 30th April 1841.	24,693 5 8¼	17,212 1 2	41,905 6 10¼	2,22,959 1 11	1,81,053 11 ¾
From 1st May 1841, to 30th April 1842.	28,426 9 2	18,244 13 4	46,671 6 6	2,29,506 7 7	1,82,835 1 1
	53,119 14 10¼	35,456 14 6	88,576 13 4¼	4,52,465 9 6	3,63,888 12 1¼

(*Signed*) W. M. SMYTH, *Captain, Engineers,*
Superintendent Nuddeah Rivers.

No. 44. *c.*

The following Abstract Statements [marked A. and B. compiled in the Military Board's Office] shew the Collections and Expenditure on the Balleaghatta and Circular Canals, Tolly's Nullah, and Nuddea Rivers.

A.

Balleaghatta and Circular Canals and Tolly's Nullah.

Years.		Expense for improving Navigation, &c. including Superintendent's salary and establishments.	Expenses on account of Toll Collections.	Total Expenditure.	Gross Collections	Surplus.
1804-5 to 1835-36 and from May to November 1836.	As per Statements furnished by the Accountant General, through the Sudder Board of Revenue.	90,870 11 3	2,45,421 11 8	3,36,292 6 11	2,722,721 6 5	2,386,428 15 6
1836-7 to 1841-42.	As per Statement prepared in the Board's Office.	1,52,382 13 5	46,320 15 4	1,98,703 12 9	7,91,864 6 3	5,93,160 9 6
	Total Amount Rs.	2,43,253 8 8	2,91,742 11 0	[illegible],34,996 3 8	3,514,585 12 8	2,979,589 9 0

The expenses for constructing Houses for Toll Darogahs, New Dock at Balleaghatta, Tow-path and Roads, &c. on the banks of the Canals, and all other charges connected with the Canals, have been included in the item of expenditure of Rupees 152,382 : 13 : 5, as per Bills passed through this Office during the years from 1836-37 to 1841-42. The total expenditure of the New Circular Canals, &c. is not included in the above statement; but the total cost of the whole from the commencement, up to the 1st May 1835, stands thus as per statement, recorded in the Board's Proceedings of the 27th October 1835; viz.

Circular Canal with Iron Bridges, Lock, Gate, Superintendent's Salary, Establishment, and the purchase of Ground, &c. ..	14,43,473	11	1½
Sunderbun Canal, ...	3,33,653	15	8½

No. 44. *d.*

B.

Nuddea Rivers.

Years.		Expenses for improving Navigation, &c. including Superintendent's salary and establishment.	Expenses on account of Toll Collections.	Total Expenditure.	Gross Collections.	Surplus.
1824-25 to 1829-30	As per Statement furnished by the Accountant General. ..	21,342 10 11	1,04,076 15 3	3,17,419 10 2	5,70,120 3 0	2,52,700 8 10
1830-31 to 1839-40	As per Do. by Captain Smyth, vide Proceedings 9th Feb. 1841.	3,28,397 3 10	1,48,712 6 4	4,77,109 10 2	15,97,289 5 9	11,20,179 11 7
1840-41 and 1841-42	Ditto do. ditto.	53,119 14 10	35,456 14 6	88,576 13 4	4,52,465 9 6	3,63,888 12 2
	Total amount Rupees, ..	5,91,859 13 7	2,88,246 4 1	8,83,106 1 8	26,19,875 2 3	17,36,769 0 7

No. 45.

No. 706.

FROM UNDER-SECRETARY TO THE GOVERNMENT OF BENGAL,

TO THE MILITARY BOARD.

Revenue Department

GENTLEMEN, *Fort William*, 10*th July*, 1843.

I have the honor, by direction of the Deputy Governor, to acknowledge the receipt of your Letters, No. 125, dated 9th May last, and No. 1095, dated the 15th ultimo, with their respective enclosures, and to inform your Board in reply, that his Honor is pleased to sanction, as regards Boats of traffic only, the introduction of the mode of measurement in force in the Calcutta Canals, under the Notification of the 28th November 1839, on the Nuddea Rivers; and to extend the provisions of the Order of the 16th May 1837, to the Matabhanga and Jellinghee.

2nd. I am desired to draw your Board's attention to the large surplus (amounting to Rs. 17,36,769) now available for facilitating the Navigation of these Rivers, and to request that you will consider and suggest what may be the most advantageous mode of applying the whole, or any part of this sum for the benefit of the public, as contemplated by the Law of 1824.

3rd. In regard to the Calcutta Canals, I am directed to observe, that until allowance has been made for the expense of the public works alluded to in the 2nd Para. of your Board's Letter of the 9th May, the actual surplus available on the 30th April 1842, cannot be known, and your Board are accordingly requested to furnish further information on that subject.

4th. But as the existence of a very considerable surplus of these Toll Collections cannot, after making every allowance, be doubtful, your Board are requested to offer such suggestions for the beneficial disposal of these funds also, as may seem called for, and at the same time state whether in the opinion of your Board, it would be advisable to make any further reduction in the Tolls levied on the Calcutta Canals, corresponding with that now sanctioned in those of the Rivers.

5th. His Honor, before taking into consideration the question of Dr. Fuller's allowances, is desirous of learning the effect thereupon of the present arrangements. The instructions proposed to be given to Captain Smyth in the 7th Para. of your Board's Letter of the 15th ultimo, have his Honor's approval.

I have the honor to be,
Gentlemen,
Your most obedient servant,
(Signed) CECIL BEADON,
Under Secretary to the Government of Bengal.

P. S.—The enclosures of your Letter are herewith returned, copies having been kept for record.

No 46.

No. 2087.

TO THE SUPERINTENDING ENGINEER, *L. P*

27th July, 1843.

SIR,

With reference to your Letter, No. 1885 of the 23rd November last, and Capt. Smyth's Letters, Nos. 438 and 11 of the 29th April, and 15th May last, I am directed by the Military Board to annex Extract Paras. 1 and 5, of a Letter, No. 706, of the 10th instant, from Mr. Under-Secretary Beadon, communicating the sanction of Government to the introduction, as regards Boats of traffic only, of the mode of measurement in force in the Calcutta Canals, under the Notification of the 28th November 1839, on the Nuddea Rivers; and to extend the provisions of the Order of the 16th May 1837, to the Matabhanga and Jellinghee Rivers.

2nd. The Board request you will, with advertence to the 5th Para. of Mr. Beadon's Letter, desire Captain Smyth to insert a notification in the public papers of the changes authorized, for the information of the public, both in the Native and English language.

I have, &c.
(Signed) H. DEBUDE,
Secretary, Military Board.

No. 47.

No. 2088.

TO THE ACCOUNTANT GENERAL, DEPARTMENT OF PUBLIC WORKS.

SIR,

I am directed by the Military Board to transmit the enclosed* Statements prepared in your Office for the Sudder Board of Revenue, and an Extract, paragraph 3rd, from Mr. Under-Secretary Beadon's Letter, No 706, of the 10th instant, together with the paragraph alluded to therein, and, with reference to the requisition of Government for further information, to request a supplementary Statement (as far as obtainable) of the original cost of the Excavation of the Balleahghatta Canal, and the Tolly's Nullah, and of the Tolls realized since they came into use, down to the periods already furnished, together with a statement of expense incurred on account of Toll collections.

I have, &c.

MILITARY BOARD OFFICE,
27*th July*, 1843.

(*Signed*) H. DEBUDE, *Major*,
Secretary, Military Board.

No. 47. *a*.

Extract from Mr. BEADON'S *Letter, No.* 706, *dated* 10*th July*, 1843.

Para. 3rd.—In regard to the Calcutta Canals, I am directed to observe, that until allowance has been made for the expense of the public works alluded to in the 2nd Para. of your Board's Letter of the 9th May, the actual surplus available of the 30th April 1842, cannot be known, and your Board are accordingly requested to furnish further information on that subject.

No. 47. *b*.

Extract from Military Board's Letter, No. 125, *dated* 9*th May*, 1843.

Para. 2nd.—With regard to Statement A, we beg to observe, that the cost of excavating the Circular Canal and constructing Bridges, which is Rupees 14,43,473 : 11 : 1½ and the Sunderbund Canal, Rupees 3,33,650-15-8½, as well as that for Tolly's Nullah and th Balleeaghatta Canal (which is not known to us) is not shown in this Statement.

No. 48.

No. 6110.

FROM THE MILITARY BOARD,

TO THE HONORABLE W. W. BIRD, ESQ.

Deputy Governor of Bengal.

Regarding the most advantageous mode of applying the whole or a portion of the surplus collections from the Nuddea rivers and *Calcutta* Canals.

Revenue Department.

Fort William, 26th January, 1844.

HONORABLE SIR,

We have now the honor to address your Honor in continuation of our Letter, No. 4545, of the 10th November last, and especially with reference to the 2nd Para. thereof, regarding the most advantageous mode of applying the whole or a portion of the surplus collections from the Nuddeah Rivers and Calcutta Canals, as requested in Mr. Under-Secretary Beadon's Letter, No. 706, of the 10th January last.

2nd. We have not yet been furnished with the information called for from the Accountant General's Office regarding the exact cost of the Circular and Balliaghatta Canals and Tolly's Nullah. But we informed Government on the 27th October 1835, that the total cost of the Circular Canal was 14,80,408 Rupees. Tolly's Nullah having been undertaken as a private speculation, has probably cost the State nothing.

Regarding the Balliaghatta Canal, we have unfortunately no information whatever; but if the cost be unknown, so likewise is the amount of collections, a portion of which would have to be accounted for. For the present, and pending further information, it will not perhaps be unfair to omit both these items, and then if the known outlay on the Circular Canal be alone considered, the clear available surplus collection would stand thus:

Surplus collection in Balliaghatta and Circular Canals, and Tolly's Nullah, ...	29,79,589	9	0
Nuddea Rivers, ...	17,36,769	0	7
	47,16,358	9	7
Deduct outlay on Circular Canal, ...	14,80,408	0	0
Total Rs.	32,35,950	9	7

3rd. The points on which we are instructed to report are—first, as to the disposal of the surplus already accumulated; and secondly, the expediency of a further reduction of the Tolls; but as we have reason to believe the latter measure may be closely connected with the determination of the Government on the former, we proceed to offer our observations on the first point.

4th. The peculiar character of the Nuddeah Rivers, which renders the adoption of any extensive means for permanently improving their Navigation wholly impracticable, is well known to Government; but the importance of facilitating, by every possible means, the traffic through the Rivers is so great, that whatever with this view can be attempted with a reasonable prospect of success, should be undertaken. On this subject we sincerely regret to add, that the fickleness and uncertainty of the Channels of these Rivers is only confirmed by the experience of every succeeding year, and judging from the frequent and loud complaints which have been recently, and during the past year, preferred by, and through, the Chamber of Commerce, we fear the Channels have lately been, and now are, as impracticable as they have ever been known to be.

5th. We know not how we can better express, or more strongly support our own opinion regarding those Rivers, than by quoting at length Paras. 132 and 133, of the Printed Report, dated 29th November 1831, prepared by the Committee directed to report on this very subject, consisting of Colonel McLeod of Engineers, Captain (now Lieut.-Colonel) Forbes, and Mr. May, for many years Superintendent of the Nuddea Rivers.

" Although we are not aware of any mode by which the impediments which annu- " ally present themselves to the free Navigation of the Nuddea Rivers can be permanently " overcome or guarded against, experience having proved that the changes which take " place in the course of the great River in one season (and which must necessarily more or " less influence the Navigation of all rivers branching from it,) afford no data to determine " what the next may produce ; nevertheless, we do conceive it to be an object of the utmost " importance, that so long as the waters of the Ganges will flow into any one of their " channels, measures should be adopted so to conduct them through that Channel, as to " secure the greatest depth for the longest possible period of the year.

" In the absence therefore of a regular locked Canal, calculated to act in lieu of the " Nuddea Rivers in the eight dry months, we would beg most respectfully to recommend, " that not only should the measures hitherto taken with the view of facilitating the " Navigation of the Jellinghee be persevered in, but that every additional means affording " a reasonable prospect of promoting this object, should be resorted to."

6th. Seeing, therefore, that any permanent improvement of the Navigation is impracticable, and that all the ordinary and temporary measures adopted with the same view have so little benefited the Trade, we beg very respectfully to submit our opinion on the subject of the formation of a new and artificial line of water-carriage in supersession of that by the Nuddea Rivers—we refer of course to the Rajmahl Canal.

7th. As the practicability of this work has been, as we conceive, carefully considered, and its details of execution, cost, and probable returns have been fully entered into in the Report above referred to, and in a subsequent Report of the same Committee, dated 15th February 1841, we have only to refer your Honor for particular information on these several points to the Report in question ; but we beg to submit a few general remarks on the project.

8th. The Canal is proposed to be excavated between the (comparatively) deep water at the head of the Delta of the Ganges at Rajmahl and the deep water in the Mirzapore Creek, above the entrance of the latter into the Hooghly ; the Canal would be 130 miles long, having a breadth of 50 feet at bottom, and carrying at the lowest depth 5 feet water. Its cost, including locks, stop gates, dam bridges, and outlets, and 20 per cent. for contingencies, is calculated to be 38,47,437 Rupees. The advantages to be drawn from it, independently of its being permanently Navigable, are very important. First, boats proceeding through it would reach Rajmahl, on the great River, by traversing a distance of 202 miles, instead of 528 miles as by the Soonderbund route, thus saving 326 miles in distance, and from 15 to 20 days in time. Secondly, it would closely approach, and give great additional value to two of the richest mineral fields in India, now comparatively inaccessible. Some of the richest iron ores, at present utterly neglected, though lying so close to Calcutta, will be approached by the line of the Canal, and Capitalists offered the means of working them to greater profit and with more ready returns, the practical difficulty hitherto having been the want of navigable streams or easily passable roads. Thirdly, as regards coals, the Canal would approach to within 30 miles of the regularly worked Coal fields, and this distance might be reduced to about 15 miles by means of a navigable branch of the Adjie, and thus the present circuitous route by the Damooda (often only available for five or six weeks in the year) might be abandoned. This advantage can hardly be over-estimated, when the rapidly increasing demand for coals in Calcutta is considered.

9th. And we must only allude in addition to the above advantages to the facilities the Canal would afford for irrigation, which again would be materially enhanced in importance by the admirable water-carriage to Calcutta, or the best market which the Canal would afford for the produce raised by its own waters, and to the variety of building materials which would become accessible, to feel assured that the importance and utility of the work must be at once admitted.

10th. The income from it, it is calculated, will amount to 5,80,000 Rupees per annum, or 14½ per cent. on the gross expenditure, estimated at 40 lacks, (See Para. 54 of Report, dated 15th February 1841,) to be raised by a Toll of 2 Rs. per 100 maunds, on all boats passing through the Canal. On this head we have only to observe, that the calculations appear based on safe data, and the per centage is amply large to cover all the incidental expenses of repairs and establishments, and still leave a considerable surplus.

11th. Such are the general features of the project, and the advantages so great, that we trust we shall be justified in strongly recommending the work to the favourable consideration of Government. We may be permitted to add, that the question will now be considered by Government under circumstances very different from those which obtained on the date of the First Printed Report, (28th February 1831) inasmuch as the chief objection which could at that period have been urged against it, viz., the necessity for a heavy disbursement, in the first instance to be drawn from the public resources, now no longer exist, the actual surplus as exhibited in Para. 2, the subsequent collections up to this date (not considered in the above item,) and the continuance of the existing Tolls, or even a much lighter tax, on the Nuddea Rivers and Calcutta Canals until the opening of the great Canal, would, without trenching in the least on the resources of the State, furnish funds more than sufficient for the purpose

12th. The outlay of the accumulated surplus on such a work seems to us quite legitimate. These funds have been raised by a tax on the Inland trade of Calcutta, and the Canal would be for the benefit and encouragement of that trade, and we conceive such a work would be highly acceptable to the Mercantile community.

13th. The Reports, Plans, &c. are not officially before our Board, but that a very valuable mass of information has been obtained, may be readily gathered from a perusal of the Printed Reports, and the intimation therein conveyed of the extensive Plans and Drawings stated to have been prepared; and though we do not observe any allowance made in the estimated cost for remunerating the Zemindars and land owners for the ground to be occupied by the Canal, and as therefore on this account, and probably many more, extensive alterations to the estimate must be made, still so much of the important preliminary work has been done, and the vast utility of the Canal, as we hope, so fully established in our preceding Paras., that we beg most respectfully to recommend the further consideration of the project, and to be favoured with the orders of Government towards carrying it out. Should, however, the Government harbour misgivings respecting the successful execution of this project in any of its parts, it occurs to the Board that the subject is of sufficient importance to countenance a suggestion that the whole Scheme may be submitted to the scrutiny of men of the highest professional repute in this branch of Engineering in England.

14th. With reference to a further reduction of the present rates of Tolls, we beg to submit, that if the construction of the Canal, or any other work of equal importance and magnitude be determined upon, it will probably be advisable to continue the rates as at present, with the view of ensuring an annual surplus in furtherance of the great work now proposed. This surplus, as respects the Nuddea Rivers, would doubtless be somewhat diminished by the outlay for keeping up the establishment of lighters for Canals, as recommended in our Letter, No. 5817, of 12th instant, should that suggestion be acted upon.

15th. But if the great work, whatever it may be, be not taken in hand, we beg to suggest that the Tolls on the Nuddea Rivers be abolished altogether, unless Government propose acting extensively on the suggestion referred to in the last Para., in which latter case the Tolls might be hereafter reduced, when it shall have been ascertained by experience what the probable amount of lighterage will be; and regarding the Calcutta Canals, as nothing remains to be done to them beyond ordinary repairs and renewals of wear and tear, we would suggest, that the Tolls there also be reduced, so that the amount realized might merely cover all costs and charges of maintaining them.

We have, &c.

(*Signed*) J. CHEAPE, *Lt.-Col. Chief Engr. M. M. B.*
,, R. BENSON, *Lt.-Col. Offg. M. M. B.*
,, T. M TAYLOR, *Lt.-Col. M. M. B.*

No. 49.

No 2935

FROM THE MILITARY BOARD,

TO THE HONORABLE W. W. BIRD, ESQ.

Deputy Governor of Bengal.

Submit copy of a Letter from the Accountant General, by which the Board are enabled to furnish a correct statement of the net surplus from the Collections of the Nuddea Rivers and Calcutta Canals, at present in the hands of Government.

Revenue Department

Fort William, 30*th August,* 1844.

HONORABLE SIR,

In continuation of our Letter, No. 6110, of the 26th January last, on the subject of the most advantageous mode of applying the whole, or a portion, of the Surplus Collections from the Nuddea Rivers and Calcutta Canals, we have the honor to submit the annexed copy of a Letter, No. 58, of the 18th May last, from the Accountant General, which enables us now to furnish a correct statement of the Net Surplus from the Collections, at present in the hands of Government.

2nd. The subjoined statement does not exhibit the cost of excavating Tolly's Nullah, and as the outlay was not borne by the Government, but by Colonel Tolly, its omission is of no consequence.

Statement shewing the Expenditure and Toll Collection on the Circular Canal and Tolly's Nullah and Nuddea Rivers, for 1842-43 *and* 1843-44.

Years.	Expenses for improving Navigation, &c., including salary and establishment.	Expenses on account of Toll collection.	Total Expenditure.	Gross Collection.	Surplus.	Total. Surplus.	
1842-43, ..	12,699 11 5	10,003 7 10	22,703 3 3	1,60,595 7 4	1,37,892 4 1		
1813-44, ..	31,841 8 1	10,368 7 6	42,209 15 7	1,66,491 5 8	1,24,281 6 1	2,62,173 10 2	Circular Canal & Tolly's Nullah.
1842-43, ..	27,691 12 2	27,570 1 2	55,261 13 4	2,46,991 15 7	1,91,730 2 3		
1843-44, ..	30,777 5 4	21,027 6 8	51,804 12 0	2,33,091 13 0	1,81,287 1 0	3,73,017 3 3	Nuddea River.

Total Surplus of the years 1842-43, and 1813-44.	6,35,190 13 5
Surplus of Collection of the Circular Canal, Tolly's Nullah, and Nuddea River, up to the 30th April 1812, Reported to Government on the 26th January 1844, ...	32,35,950 9 7
Total Surplus up to the 30th April 1814, ...	38,71,141 7 0
Deduct the original cost of excavating the Balleaghatta Canal, which was not deducted from the Statement of Surplus already submitted to Government, as it was then not known, but this information is now obtained from the Accountant General, vide his Letter, No. 58, dated 18th May 1844, ...	1,53,720 2 11
Net Surplus Rs.	37,17,421 4 1

We have, &c.

(*Signed*) J. CHEAPE, *Lt.-Col. Chief Engr.*
,, R. BENSON, *Lt.-Col. M. M. B.*
,, W. BURLTON, *Lt.-Col M M. B*

No. 49. *a.*

No. 58.

To THE SECRETARY TO THE MILITARY BOARD.

Revenue Department.

SIR,

Referring to my Letter to your address, No. 312 A. of the 3rd November last, stating that the Officers named in the margin have been addressed for information relative to the Tolly's Nullah and the Balliahghatta Canal, and that on the receipt of their reply the statement called for in your communication of the 27th July preceding, No. 2080, would be furnished; I have now the honor to acquaint you, that the above authorities having failed to afford any information on the subject, I applied to the Secretary to the Government of Bengal for any documents in his Office that might throw light on the case, when I was favoured with the proceedings of Government from 1775 to 1805. On perusal of many of these papers, I learn that on the 4th September 1775, Colonel Tolly proposed to Government to cut a navigable Canal at his own expense from Salmon's Bridge to Balliaghatta, afterwards called Tolly's Nullah, in consideration of a Grant for 12 years of a Toll at 1 per cent. on the Invoice value of all goods brought by that navigation. This proposal was approved by Government as per Resolution, dated the 28th December 1775, and the Grant allowed for the period specified. On the death of Colonel Tolly, this Grant was continued for 15 years to his widow, who remained in possession till the expiry of the lease on the 4th July 1804,

Collector of 24 Pergunnahs.
Deputy Collector of Calcutta.
Secretary to the Sudder Board of Revenue.

when the Canal was taken possession of on the part of Government, and Tolls began to be collected for the first time by Government Officers. From the above statement, the Board will perceive, that the information required by them as to the original cost of excavating Tolly's Nullah cannot be ascertained, as no accounts of such expenditure were rendered by the Grantee to the Office of Accountant, nor, as the expense was not borne by Government, does the information seem to be of material consequence—the whole transaction was of a private character.

As regards the Balliaghatta Canal, I have the honor to state, that the cost of excavating this Canal appears, on reference to the books of this Office, to have amounted to Company's Rupees 153,720-2-11⅓, as shown in the Memorandum hereto annexed.

I have the honor to be,
Sir,
Your most obedient servant,
C. MORLEY,
Accountant General,

FORT WILLIAM,
ACCOUNTANT GENERAL'S OFFICE,
The 18th May, 1844.

No. 49. *a.*(1)

Memorandum shewing the original Cost of Excavating the Balliaghatta Canal.—Extracts from the Books of this Office.

When charged.	Description of Charges.		Amount in Co.'s Rupees	
1819-20.	Amount paid the Committee for Improving the Town of Calcutta, being the sum disbursed from their Funds for the original construction of the Canal at Balliaghatta, Sicca Rupees, ...	51,499 3 5	54,932 7 11	
	Interest thereon from the period of expenditure up to the 28th October 1819, in consideration of the transfer of the Canal to Government, ...	23,708 6 5	25,288 15 4	
1799-1800	Purchase of Lands for the New Canal, ...	25,403 7 0		80,221 7 3
1808-9.	Ditto of ditto for ditto, as per Board's Order of 9th August 1808, ...	21,480 0 0		27,097 0 0
1809-10.	Paid for construction of Roads in the vicinity of Canal from Boitakhannah to Salt Water Lake, ...	10,396 4 0		22,912 0 0
1810-11.	Purchase of Lands for the New Canal.	11,050 2 0		11,089 5 4
1811-12.	Ditto of ditto for ditto, ...	575 4 0		11,786 12 9⅓
				613 9 7
			Company's Rupees, ...	1,53,720 2 11⅓

(*Signed*) C. MORLEY,
Accountant General

FORT WILLIAM,
ACCOUNTANT GENERAL'S OFFICE
REVENUE DEPARTMENT,
The 18th May, 1844.

No. 50.

No. 3041.

To F. P. STRONG, ESQ.

Surgeon of the Suburbs, &c &c. &c.

SIR,

I am directed by the Committee upon the Fever Hospital and Municipal Improvements, to transmit to you herewith the Papers noted in the margin, with which you sometime ago furnished them, and which they are desirous of completing, and will be obliged if you can assist them in that particular.

1 Letter from J. Master, Esq. Magistrate Suburbs of Calcutta, dated 6th October 1828, to Messrs. Jessop and Wilson.
2. Minute on the unhealthiness of the Suburbs by Dr Briton.
3. Letter from J. Master, Esq. dated 7th October 1828, to Mr T. Wilson.
4. Letter from ditto, dated 12th October 1828, to ditto.
5. Letter from H. Shakespear, Esq. Secretary to Government, dated 27th November 1828, to J Master, Esq
6. Letter (printed) from Committee of Improvements in the Suburbs (no date) to Government.
7. Memorandum on the unhealthiness of the Intally Suburbs by Mr. T. Wilson.

2. In Mr. J. Master's (Magistrate of the Suburbs) Letter of the 7th October 1828, to Mr. T. Wilson, there is a reference made to a Petition by the Inhabitants of the Suburbs to the Governor General, relative to the state of the Drains in their neighbourhood, the Committe will be obliged if you can procure for them a copy of this Petition, together with a copy of Mr. Wilson's letter to Mr. Master, transmitting the Petition for his perusal.

Mr. Master's letter also refers to obtaining the *more copious* remarks of Dr. Briton on the state of the Suburbs, will you kindly state if you are aware whether these more copious remarks of Dr. Briton were obtained—if so, can they now be procured from the office of the Magistrate of the 24-Pergunnahs.

3rd. Mr. H Shakespear (Secretary to Government) in his letter of the 27th November, 1828, to Mr. Master, in reply to that gentleman's Report on the Suburbs, dated the 3rd of the same Instant, (in reply to a letter from the Secretary to Government of the 25th September 1828,) states that "His Lordship in Council regrets that "the necessity of strict economy prevents his authorizing any "considerable immediate outlay from the Public Treasury in "furtherance of the very important objects of Improving the Salubrity of the Environs of the "City. It only remains therefore to consider how far it may be practicable to supply the "Allypore Jail with convicts from the Jails in Bengal, for the purpose of making such of "the Improvements suggested, as can be carried into effect by the labour of convicts."

1. A Copy of this Report will also oblige.
2. A Copy of this letter is likewise thought necessary.

3rd. "It occurs to His Lordship in Council, that prisoners now under sentence of "banishment to the number of twelve or thirteen hundred in the Jails within the Division "of Moorshedabad, Dacca, and Calcutta, might be transferred to the Allypore Jail under "the orders of the Nizamut Adawlut, and the Court will accordingly be consulted on the "propriety and expediency of adopting the measure." Will you be so good as to state if you are aware if *more convicts were made available at the Allypore Jail to improve, cleanse, and keep in order, the Suburbs, in consequence of the reference of the Government to the Nizamut Adawlut.*

4th. In the letter (printed) of the Committee of Improvements in the Suburbs (no date) to Government, reference is made to the following papers.

First. Letter from Secretary to Government (no date) to the Committee of Improvements in the Suburbs, enclosing an extract of a Memorandum relative to the Improvements of Intally and Tilljullah.

Second. Representation made by the Intally Committee to the Government relative to the Intally Suburbs.

5th. The Committee will be obliged by your furnishing them with these papers, or such of them as may be in your power, and at the same time by your stating the *name* of the gentleman to whom the representation of the Intally Committee had been referred

and who agreed in the necessity of some Improvements taking place. The Municipal Committee would also like to be furnished with a copy of the Memorandum containing the Improvements suggested by the gentleman noticed above.

6. Among the papers now transmitted for your persual is a paper from Mr. T. Wilson entitled "Memorandum on the unhealthiness of Intally and the Suburbs of Calcutta"—the Committee will be obliged by your stating, if you are aware whether the above Memorandum has been submitted to the Government or the Magistrate of the Suburbs, if so, they will thank you to furnish them if in your power, with a copy of the letter which transmitted the above Memorandum, and at the same time inform them what resulted from the transmission of that document.

I have the honour to be,
Sir,
Your most obedient servant,
(Signed) J MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL:
5th March, 1846.

No. 50. *a.*

TO MESSRS JESSOP AND WILSON
Entally.

GENTLEMEN,

As you were kind enough on a former occasion to interest yourselves in the Improvement of that portion of the Suburbs in which you reside, I request you will do me the favor of pointing out, with reference to the accompanying Extract of a letter from Government, any particular works which you may consider calculated to promote the object in view, and to suggest where it would be advisable to excavate tanks or remove jungle; the manner in which the Suburbs of Calcutta may be more effectually drained, and in fact any particulars, which may have fallen under your own observation.

As the season for conducting such works is fast approaching, I shall feel much obliged by an early communication of your sentiments.

I am,
Gentlemen,
Yours obediently,
(Signed) J. MASTER,
Magistrate.

FOUZDARRY ADAWLUT,
SUBURBS OF CALCUTTA:
The 6th October. 1828.

No. 50 *a.*(1)

Extract of a letter from the Secretary to Government in the Judicial Department, under date the 25th September, 1828.

"I am directed by the Right Honorable the Governor General in Council to desire that you will submit to Government your sentiments on the practicability of remedying, generally, the unhealthiness of the Environs of Calcutta."

(Signed) J. M.
(A True extract,) *Magistrate.*

No. 50. *b.*

Note by Doctor Briton on the Insalubrity of the Entally Suburbs.

The unhealthiness of Entally is lamentably verified by the number of deaths which have occurred to the inhabitants within the last few years. The insalubrity is doubtless owing to the want of public Drains; to the filthy state of those in existence, which at present are wholly useless for the purposes intended; to the want of public Tanks for the supply of good water to the Residents; and, above all, to the want of free circulation of air from a variety of causes.

To remedy the evils under which the inhabitants of Entally are unquestionably suffering, I know of no better plan than the one which a body of the Residents are at present adopting, from the best possible of motives, that of preserving human lives and conducing to the health, welfare and comfort of the community at large, Native as well as European, in the Suburbs of Calcutta.

P. BRITON.
Superintendent of

No. 50. *c.*

To T. WILSON, ESQ.

SIR,

I feel much obliged to you for having forwarded the accompanying petition* for perusal, and I see no reason why it should not be submitted to the Governor General, notwithstanding the communication which I yesterday sent to you.

I am sorry that you did not occasionally acquaint me with the state of particular Drains and Roads (alluded to in the petition) as I hope you have no reason to suppose, that such references would not have met with immediate attention—their condition is only to be ascribed to the small number of convicts at the disposal of the Magistrate, and his very limited resources in other respects.

I am much indebted to you for the readiness with which you seem disposed to meet my wishes, and it will give me satisfaction to meet yourself and other Gentlemen, residents of Entally, in furtherance of objects so desirable, and which the Government seem prepared to patronise.

Your's faithfully,
J. MASTER.

ALLIPORE,
7th October [1828 ?]

I will take an opportunity of addressing Dr. Briton—his local and professional knowledge will render his suggestions highly valuable—and he will no doubt have the kindness to favor me with his sentiments at length—instead of the concise manner in which he has furnished the certificate. J. M.

* The Municipal Committtee have not before them a copy of this petition, nor copy of the Letter referred to in the Paper marked No. 50. *d.*, nor an Official copy of the Letter, noticed on the margin as No. 6, of the Lette marked No. 50.—J. M.

No. 50. *d.*

To THOMAS WILSON, ESQ.

SIR,

* See Note at foot of Paper marked No. 50. e.

I have been favored with your letter* of this date, for which I beg to offer my acknowledgments.

It occurs to me that the space to which you propose to confine your observations may be considered too limited, and your suggestions would prove doubly valuable and interesting, if you could make it convenient to extend your remarks to Sealdah and Curyah—and this you will perhaps be able to do, with Mr. Beeby's kind aid, particularly as a trifling delay will be immaterial. It will give me very great pleasure to meet yourself and Mr. Beeby, as soon as our respective thoughts on this important subject are a little more matured.

Your's faithfully,
J. MASTER

12th October, 1828.

No. 50. *e.—See* No. 51. *f.*

No. 50. *f. omitted to be printed—See Note at foot of Paper marked* No. 50. *e.*

No. 50. *g.*

Memorandum of matters or causes which, it is believed, occasion the Insalubrity of Entally and the adjacent parts in the Suburbs of Calcutta. By T. Wilson, Esq.

While the causes may be said to be various, the following may be said to be some of the chief, if not the only ones.

1st. From the want of a more free circulation of air occasioned by jungle, which in some parts is so very thick as to appear quite impenetrable.

2nd. To the great quantity of leaves, which falling into the drains, decay and putrefy—the falling of the leaves into the drains is occasioned by their being, in numberless places, overhung with trees, which not only branch over the drains, but the roads also, the evils arising from this might be obviated by having all such trees, whose branches overshadow the roads and drains, cut down as nuisances, which no where should be allowed to exist.

3rd. To the water in the drains becoming stagnant for want of having a free course (the stoppage of the water in the drains may be occasioned partly by the leaves of trees and other substances getting into the drains and blocking up the passages of them)—of the unwholesomeness of stagnant water, it need hardly be mentioned, it being universally acknowledged, that disease is occasioned by it, and that pestilential matter may be taken into the stomach in the act of breathing, and thereby occasion fever and other most direful effects and disorders.

4th. To the noxious exhalations arising from decayed leaves and other hurtful substances, as well as from small ponds or tanks and other marshy and swampy places, which abound in the Suburbs. The most of these are occasioned by *brick merchants.*

5th. To the exhalations arising from the [Entallee] Canal, which in consequence of its containing so large a body of *stagnant* water and other impurities, proves a fountain, or source of pestilence.

6th. To the effluvia arising from human ordure. In the Suburbs the *maturs* never convey the filth to the river—nor do such of the Natives who have necessaries, ever keep them clean; but as their necessaries have a communication with the public drains, the filth runs into them. But the major part have no necessaries. In many instances they dig holes in the earth, where they bury the filth, but as these holes in the earth, where they bury the filth, are seldom of sufficient depth, the effluvia at times is not only offensive, but, as must naturally be the case, very hurtful from the increasing quantity and concentration of effluvia by the excrementitious matter in the drains, &c., suffered to assume, unremoved, a putrescent action, extremely prejudicial to the health of the inhabitants.

7th. To the noxious exhalations arising from the putrefying bodies of calves, dogs, cats, snakes and other dead animals, which often lie in a state of complete putrefaction in the jungly parts of the Suburbs, and are constantly in the night thrown there, under the trees, by the Natives themselves.

8th. To the want of proper drains for draining off of stagnant waters from the drains, and this of itself would go a great way in contributing much towards rendering the climate more salubrious, for the drier land becomes, the more will fatal diseases decrease.

9th. To woods or jungles, which in many places are so very thick as to appear, as before mentioned, to be impenetrable, the consequences of which is, that, the beams of the sun being thereby hindered from penetrating to and warming the soil, the soil becomes damp, the air confined, and the vapour arising from the ground so *corrupt*, as to effect the whole of the surrounding atmosphere, and when storms and gales arise, putrid particles of all kinds are flown about, far and wide, in every direction.

10th. To increased population, and the hoarding together of the Natives in large bodies.

11th. To the want of a sufficient number of Tanks containing a sufficiency of good and wholesome water.

12th. To the want of good broad roads, the present ones being extremely narrow, winding, and wretchedly laid out.

13th. To the Lake to the east, the noxious exhalations from which have long been noted as occasioning sickness—by deepening its channel—bunding and draining it, many thousand Begahs of *valuable* land would be restored to agricultural purposes, and afford the means of supplying the wants of a large and still increasing population of this country, besides from the sale and revenue of it, much might be obtained towards defraying the expences of making the Suburbs more salubrious.

That exhalations and other noxious vapours arising from jungles &c., do really occasion sickness of various kinds, the page of History, and the experience of mankind, fully testify, not only in India, but in every other country in all parts of the habitable globe, these evils are great, and many loudly call for protection.

One of the chief causes of these distresses might easily be removed by opening a number of main and cross roads running from East to West and North to South, by which means, besides the cutting down of the trees which hang over the public Roads and drains—the trees thus cut down, a very considerable part of jungle would be not only removed and a more free circulation of air obtained, but it would have the further advantage of being the means of causing a great number of Europeans and East Indians who are now becoming very numerous, to settle in the Suburbs; and Entally and Teeljullah being so near the centre of the Town, they would prefer those to all other places in the Suburbs, by which means the Suburbs would become better cultivated and jungle altogether removed—for the Natives would then go further into the interior, and with them,

their filthiness—for the natives are certainly the most filthy sort of people on the face of the earth, and want of cleanliness is acknowledged to be a great cause of want of health, &c.—A further advantage to be gained hereby, would be, that, a great number of houses would then be built—the proprietors of which would be most glad to pay, as in Calcutta, a tax for the repairs &c. of the streets.—But perhaps enough has been said, and leaving the matter to wiser heads, they will devise means for increasing the salubrity of the Suburbs, which, beyond a doubt, will have the effect of making Calcutta itself more healthy.

(Signed) THOS. WILSON.

No. 51.

To JAMES MORRIS, Esq.,
Clerk to the Committee upon Municipal Improvements—Calcutta

SIR,

In reply to your communication dated the 5th March 1846, transmitting to me certain papers with which I had furnished the Committee, and requesting my assistance towards completing them, I beg to state, that to enable me to comply with the Committee's request, I placed myself in communication with the Register to the Court of Nizamut Adawlut, and the Judge and Magistrate of the 24-Pergunnahs. The papers and information that I have been able to obtain from the Officers above cited, though not quite all that you have applied for, I have the honor to transmit herewith, together with the papers received from you.

I am, Sir,
Your obedient Servant,
F. P. STRONG.

8th March, 1846. *Surgeon to the Mysore Prince's, and to the 24-Pergunnahs.*

No. 51. *a.*

Extract—Letter from W. H. Macnaghten, Esq., Register Nizamut Adawlut, dated 15th August 1828, to H. Shakespear, Esq., Secretary to Government, transmitting Copy of the Letter of the 3rd Judge, and its inclosures.

"2. The Court direct me to observe that, on the present occasion, they have no particular remarks to offer; but they agree with the Circuit Judge in opinion that the remarks of Mr. Surgeon Strong, relative to the unhealthiness of the Environs of Calcutta, are well worthy of the consideration of Government."

No. 51. *b.*

Extract of a letter from H. Shakespear, Esq., Secretary to Government, dated 25th September, 1828, to W. H. Macnaghten, Esq., Register Nizamut Adawlut, in reply to his letter of the 15th August, 1828.

"3. The Magistrate of the Suburbs will be desired to submit his sentiments to Government on the practicability of abating the nuisance complained of by Dr Strong, and of remedying generally, the unhealthiness of the Environs of Calcutta.

No. 51. *c.*

J. MASTER, ESQ.,

Magistrate of the Suburbs of Calcutta.

SIR,

I annex an extract from Mr. Surgeon Strong's remarks respecting the Insane Hospital, and request that you will, in concert with the Magistrate of the 24-Pergunnahs, endeavour to remove the nuisances therein complained of.

2nd. A copy of this letter will be transmitted to the Magistrate of 24-Pergunnahs, for his information and guidance.

I am, &c.

BELVEDERE, (*Signed*) ROBERT BROWN,

The 11*th August*, 1828. 3*rd Judge*.

No. 51. *c.*[1]

Extract MR. SURGEON STRONG'S *Remarks respecting the Insane Hospital.*

[" It will be seen that the number of deaths in the Insane Hospital, in these six months, has been only 10, a number considerably less than has been usual during the same period for the last twelve years.

" It appears to me that this advantage has been produced by the making of four sunken and covered necessaries, the nuisance having previously been conveyed by an open drain from the Hospital and round the grounds.

" I have the pleasure also to report, that there has since been much less illness than usual, which I consider mainly attributable to the improvement and change above alluded to.]" " I beg leave however to remark, that the grounds contiguous to, and outside of the Hospital premises, are, in my opinion, a most unwholesome nuisance, particularly during the rainy season—the water not being drained off, but lying in the various hollows, there stagnates, and, corrupting all vegetable and animal matter it meets with, produces an atmosphere most unwholesome, even to natives who are used to it.

" There is also close to the entrance gate a burying ground, which brings together dogs, vultures, &c., which of themselves are a considerable nuisance ; and upon which ground the prisoners from the Jail of the 24-Pergunnahs are daily taken in a body for their necessary occasions ; were they to be taken nearer to the Nullah, to which this ground adjoins, or elsewhere, for such purposes, and the practice of burying discontinued at that place, it would be not only desirable, but would conduce to the healthiness of the Hospital." [" While remarking on the state of the grounds near the Hospital, it may not be irrelevant for me to observe, that having, for upwards of 20 years, applied my attention particularly to atmospheric causes of disease ; and having now, for several years, been Surgeon of the Suburbs of Calcutta, I may not be going far, if at all, out of my line of duty, in pointing out, that I consider much of the unhealthiness of the Suburbs, as well as of Calcutta, during and after the rains, to arise, in a great measure, from the state of the lands in the Suburbs immediately round about the Town ; but more particularly in the Soorah, Intally, and Ballegunge part of the Suburbs ; the lands bordering upon these parts, especially to the eastward, are not only more covered with jungle and decaying vegetable matter than elsewhere, but in almost every part of them numerous irregular excavations are to be met with.

made for brick-making, and for similar purposes. In these various holes and cavities, impure air is generated by the decay and putrefaction of vegetable matter in water, and if impure air, so produced, is, as it is known to be, capable of causing fever and dysentery, it is not unfair, to conclude that certain modifications of this Malaria, may also be the cause of cholera, which disease predominates in those climates and soils in which fever and dysentery abound; that it may be so produced is, I think, sufficiently obvious, by the well ascertained fact, that ships' crews, in a state of perfect health, and a considerable distance, even some miles from the shore, have, by a sudden land wind coming on, been fatally attacked by this scourge. A striking instance of this nature is recorded by Dr MacCulloch, in his very valuable work, lately published on the subject of Malaria—a work entitled to the particular attention of medical men and others, in this country, which is so pregnant with this source of disease. I will here add, that I can name, at this moment, several families about Intally, where the whole family are laid up with fever, produced, most indisputably, by the impure air generated about their neighbourhood by the decomposition or decaying of vegetable substances; and several are now removing up to Chinsurah, and to other places, their removal being more conducive to their recovery than any medicine they can take, while they continue to breathe this atmospheric poison."]

NOTE.—The Paragraphs within Brackets, though part of Mr. Strong's Remarks, do not form part of the Extract annexed by Mr. Brown to his letter to the Magistrate of the Suburbs.—J. M.

No. 51. *d*.

To JOHN MASTER, ESQ.,

Magistrate of the Suburbs of Calcutta.

SIR,

I am directed by the Right Honorable the Governor General in Council to desire, with reference to Dr. Strong's remarks, a copy of which was transmitted to you by the 3rd Judge of the Court of Circuit for the Division of Calcutta, on the conclusion of the monthly sessions for the 1st six months of the present year, that you will submit to Government your sentiments on the practicability of abating the nuisances complained of by Dr. Strong, and of remedying, generally, the unhealthiness of the Environs of Calcutta.

I am, &c.

COUNCIL CHAMBER: *(Signed)* H. SHAKESPEAR,
The 25th September, 1828. *Secy. to Government.*

No. 51. *e*.

To H. SHAKESPEAR, ESQ.,

Secretary to Government in the Judicial Department—Fort William.

SIR,

I have the honor to acknowledge the receipt of your letter of the 25th of September 1828, in which I am directed to submit my sentiments as to the measures which should be adopted for remedying, generally, the unhealthiness of the Suburbs of Calcutta.

Deeply interested as I feel in the subject, and anxious as I must naturally be to secure the health and promote the comforts of the inhabitants of this district, I cannot refrain from respectfully expressing my regret, that an enquiry of such extent and importance, had not been entrusted to the medical authorities, by whom it would have been ably discussed and adequately treated—indeed so conscious have I felt of my inability to undertake the

task, that I have ventured to solicit from several Surgeons holding situations in the district such hints as might aid me in the investigation of a subject of so much obscurity, and which might render my reply to your communication more explicit and satisfactory.

I will do myself the pleasure of alluding to the suggestions, which those gentlemen have considerately favored me with, after noticing such points, as have fallen under my own imperfect knowledge and observation—

The following are, in my opinion, the chief causes to which the unhealthiness, which prevails in the Suburbs, may be ascribed.

1st. To insufficient draining, the insalubrity arising from which is confirmed by general impression and general experience.

2nd. To the extraordinary height to which the floods in the river Rise, spreading through the various water-courses over the low lands, but more particularly through the Acra Nullah, Tolly's Nullah, and the Chitpore Nullah.

3rd. To the lowness of the site of the Town and the innumerable pools of stagnant water, surrounded by trees of exuberant foliage, which exclude both air and sun, and thus convert the shallow Tanks into poisonous repositories of vegetation.

4th. To a lamentable deficiency of that indispensable element—water,—most of the Tanks containing only such as is contaminated by putrified vegetation, and from its deleterious quality totally unfit for domestic uses.

5th. To the want of a free circulation of air, which is obstructed by a variety of causes, but principally by the luxuriant growth of dense and almost impenetrable underwood in the compounds and uncultivated gardens of the Native population.

6th. To the accumulation of filth in the vicinity of the houses in the crowded part of the Suburbs, which vitiates the atmosphere, and to there being no establishment allowed for its removal.

7th. In the Eastern Suburb, to the noxious vapours which arise from the Entally Canal, and which, mingling with the air, pour forth a source of pestilence. The Canal containing a body of stagnant water, and being otherwise filled with impurities.

Lastly, to the circumstance of Calcutta being bounded on the whole of its Eastern side by an extensive morass, highly favorable to the production of a noxious and baneful atmosphere.

Such being in my opinion the main causes of sickness and disease, I will proceed to point out what occurs to me as remedial measures.

And first—with regard to insufficient, or perhaps, I should rather say, inefficient draining; for the evil consists more in the multiplicity of small ill-formed drains (which it is impossible to preserve in a free and unobstructed condition) than in any actual want of artificial channels.

The Southern Environ, situated between the River and the Road leading from Allipore to Tollygunge, which includes the whole of Garden Reach, is drained into the River through the sluice on the grounds now occupied by Sir Charles Metcalfe*—the tract of land situated between the above named Road and the Ballygunge Road, as well as a large portion of Chowringhee and Short's Bazar, is drained into Tolly's Nullah through Brijeetullah; the level running from the West end of Dhurumtollah down to Bhowanypore. The Eastern Environ of the Town is drained into the Salt Water Lake, as well as a large portion of the land to the South of Ballygunge.

* ? Now tenanted by Sir Lawrence Peel; August 1846.—J. M

These facts being well ascertained, the Magistrate of the Suburbs would find little difficulty in promoting a more effectual drainage, were he supplied with an ample number of convicts, or put in possession of funds, which would enable him to command the constant services of hired labourers.

To check the influx of the River water at high tides, it would be advisable to have bunds of a broad and solid nature, constructed from the end of Garden Reach to the old Powder Mills: and cross roads or bunds should branch also towards Russapuglah from the Hooghly River to Tolly's Nullah; but this subject requires knowledge which I do not possess, and which perhaps an Engineer alone would be competent to furnish—on one point I believe there is little difference of opinion. that the outlets from each main drain should be supplied with self-operating sluice gates, built of substantial masonry, which would allow any unusual accumulation of water to escape during the rainy season, and at the same time present an effectual barrier against the highest tide.

Calcutta, with its Environs, was at one period similar to many parts of London, the whole was under water during the rains, and nothing but a low paddy field. It was raised in the first instance by each individual digging a small Tank, from which earth was obtained for the purpose of raising the foundations of houses above the water's level, these swamps were subsequently filled by the filth thrown into them in succeeding years. Tanks of larger dimensions were excavated by Natives, who accumulated wealth under the protection of the British Government. Gardens were planned—Land gradually assumed higher rate or value, and Calcutta is now raised many feet above its original level. I have also understood, that the present Circular Road, which was nothing more than a broad deep ditch, when Lord Wellesley reached the country, was principally filled up by the filth collected in the Town.

One of the principal inducements to increase the existing number of stagnant pools in the Suburbs, is the extraordinary profit arising from the manufacture of bricks, and some salutary rule* might perhaps be enacted, prohibiting the preparation of kilns, within a certain distance of the Town.

The want of pure wholesome water is a privation seriously felt by the lower classes during the hot months of March, April and May, and the excavation of a few public Tanks on eligible spots, would materially contribute to the health, comfort, and cleanliness of the inhabitants. The spots, which appeared to me likely to meet the wants of a rapidly increasing population, I have taken the liberty of marking on the accompanying plan,† their construction would furnish earth, which the Natives would gladly remove at their own expense, to fill up many of the surrounding swamps, and improvement would go forward with the exertions of Government.

The healthiness of the Suburbs, would doubtless be greatly advanced by an annual clearing away of all branches of trees within 8 or 10 feet of the ground, and of all brush-wood and jungle at the close of the rainy season; the circulation of air would also be promoted by the removal of all trees which overhang the public Roads, nor should any branch be permitted to project over the drains and ditches.

It would be a hopeless task, I fear, to endeavour to impress on the minds of the public, that such are the causes of disease, or to induce them by co-operation and on principle, to strive to eradicate them; still, much has been done of late years in the Suburbs, and the ventilation considerably improved by opening a variety of new Roads at a trifling expence to Government, and others are in progress which promise more extended benefits. Some of these recent improvements, I have marked in a bright yellow colour on the accompanying map, and the proposed new Roads in Intally division which are anxiously

* A Regulation forbidding the manufacture of Bricks within a certain distance of the Town, it is believed, was at one period in force, but has been repealed or become a dead letter.—J. M.

† This plan is stated to be not forthcoming, but a rough copy of it is in the Office of the Municipal Committee.—J. M.

desired by the inhabitants, and which I consider particularly essential, are made apparent by double dotted lines.

A. The first, which I should wish to see carried into effect, would be a straight broad Road, say 50 or 60 feet width, carried from the opening nearly opposite to Park Street, through the Curryah Bazar, towards the Lake.

B. The second, a Road of a similar description and similar dimensions opposite South Colinga Street, where it opens into the Circular Road.

C. Third, a corresponding Road commencing at Mr. Dowling's House on the borders of the Circular Road, and also to be carried towards the Lake.

D. D. D. The fourth, which I suggest, would be a Road of a semi-circular form, extending from the Cooleeah Bridge to Ballygunge, with which all the above described Streets should unite, and I fix upon this form, in order, that much valuable land and highly cultivated gardens may be avoided, and the line of Road be carried through a tract of country, where proprietors would urge few objections, and those by conciliatory measures, would in all probability be easily overcome. I could point out many others which would be eminently useful, but I confine myself to the above, as the most peculiarly beneficial alterations.

For the next cause of unhealthiness arising from the accumulation of filth in the houses of Natives, I know not what remedy to propose here, there is no demand for manure for agricultural purposes, and the only measure, which occurs to me as likely to be attended with advantage, is to give encouragement to the system of sinking wells, in which the filth would speedily undergo the process of decay.

In warm climates tranquil or stagnant water must be unsafe in any form, and the ill effects produced by the poisonous nature of the stagnated fluids in the Entally Canal, are acknowledged and complained of by all who reside within its influence—its power however will be in a great measure diminished, and the evil averted, by the excavation* of the proposed Circular Canal, which will afford from its connection with the River, a continual renovation of water, the impetus of which will scour the bed of the Canal, and thus add to the salubrity of its borders.

I will now take the liberty of alluding to the opinions expressed by the medical gentlemen, with whom I have communicated on this important subject.

Dr. Martin observes—"on assuming medical charge of the Governor General's Body Guard in October 1821, and referring to the existing Records of the Corps, I found, that the proportion of sick, particularly during the latter period of the rainy season, usually so much exceeded the average of Corps in Cantonments, that I submitted to Government, a Statement of what I considered the main causes of unhealthiness in the Body Guard, declaring my opinion, that they chiefly arose from numerous small shallow Tanks, then existing throughout the men's lines; a generally ill drained condition of the Cantonments; and the presence of underwood. Government was pleased at once to direct the removal of the alledged sources of insalubrity, by having the Pits and small shallow Tanks filled up, and one or two deep ones dug in their stead, at some distance from the lines, the grounds of which were also drained and cleared of jungle. The result of these measures was so remarkable, that but for the sudden departure of the Corps for Rangoon, I should have brought it to the notice of the Medical Board. I am confident, that in stating the reduction of fever cases during the unhealthy season, to have been from 120 and 130 per mensem, to between 30 and 40, I am in no respect over-estimating the advantages of the improvements then partially carried into effect, and notwithstanding the hardships and exposure encountered during 18 months of foreign service, which naturally predispose to subsequent

* The Circular Canal has been excavated, but that part of the Entally Canal, from the head of the Dhurrumtollah Road to the junction of the Entally Canal with the Circular Canal, being beyond the influence of the scour of the Circular Canal, is as bad as ever, and is still greatly complained of.—J. M.

illness, no one Native Officer or Trooper of the Body Guard, has died of fever since our return from Rangoon, in June 1826.

Dr. Stewart, the Assistant Surgeon stationed at Howrah, takes a more comprehensive view of the subject, and thus expresses himself—

"The inhabitants of these districts, both on the East and West sides of the River, suffer chiefly from Remittent and Intermittent Fevers, Dysenteries, Visceral and Glandular obstructions, regarding which diseases we may assume as an established fact, that they originate in all climates from that atmospherical poison, known by the name of Malaria.

"Of the nature of this poison, much has been said and written; but the most assiduous investigators of the subject, still confess their entire ignorance of its *constitution*. The laws, however, which govern its production and transmission, are sufficiently known, if not understood.

"Its *production* is traced chiefly to the operation of solar heat upon the soil, when more or less moistened with water. The soils most favorable to its elimination are the alluvial and argillaceous plains—particularly those marshy tracts along the banks or near the mouths of Rivers, which are covered by a mixture of Salt and Fresh Water, in situations where this is liable to stagnate until the return of the tides, and where it possesses during that period, the most abundant materials for the generation of miasmata from the incessant decomposition of animal and vegetable matter, subjected to high temperature, and at rest.

"The *propagation* of malaria (though occasionally very anomalous) seems to be mainly influenced by the prevailing winds; where these are irregular, or entirely wanting, it follows the course of running streams; and in ditches and over *tanks* it is held in concentration by embankments and belts of plantation. The most curious fact, however, in the history of *malaria*, and one wherein it contrasts strongly with *contagion*, which governs the epidemics of towns, is, that the former is less readily propagated through dense population, and dirty streets, than along the most spacious terraces, or through the thinly inhabited Suburbs; and that nothing checks the generation of this poison so much, as dense population and high cultivation. The most plausible explanation of this phenomenon is given by Dr. MacCulloch in the following words—'*Malaria* is a chemical compound, and therefore decomposable. It is experimentally decomposed by fire and smoke, and it is therefore probable, that amidst the known mixture which forms the atmosphere of crowded streets, or habitations, it is actually destroyed.'

"In examining the Suburbs of Entally, and those on the East side of the Marhatta Ditch, and between that and the Salt Water Lake, the sources of Malaria are abundantly evident, and there can be no doubt, that in such a situation, the salubrity of the place may be greatly increased, were it possible to condense the present population or encourage its increase by opening of new Roads, founding proper Bazars, establishing public Tanks, (similar to that of Tank Square) and abolishing and prohibiting in future all private Tanks whatever—while the ditches might be likewise diminished in number, and rendered more effectual for the purposes of general cleanliness by an active Police.

"Such measures will not only prove remedial to the insalubrity of the Suburbs, but will greatly strengthen that barrier, which they now constitute, between Calcutta and the messtritic exhalations of the Sunderbunds.

"I am unable from my own observations or inquiries, to ascertain how far the marshy tract, known by the name of *Salt Water Lake*, may possibly admit of being drained—and no doubt its muddy soil, and the strong tides and currents of Bengal, will of themselves prove great obstacles to any such undertaking; but from the introductory remarks I have made, it is quite evident, that a partial drainage will be quite insufficient for the purpose of annihilating the insalubrity complained of, nay it may even add to the evil; and that unless the portion or portions of land, so redeemed, can be speedily and effectually cleared

and reduced to cultivation, the Malaria will be greatly increased The only effectual salvation from such a consequence, in my opinion, would be the building of high and strong embankments, such as shall narrow the marsh into Canals, and never be empty. Their inner fronts should be steeply sloping, so as to expose the smallest possible surface at ebb-tide above water mark—on both sides the grass should be kept closely cut, and burned or removed as soon as mowed, while colonnades of forest trees along the ridge on either sides will, in some measure, shelter the exposed mud from the exciting influence of the sun, without interrupting the free circulation of air"

"With regard to the Sulkea Division of the Suburbs, which extends along the Western Bank of the Hooghly opposite to Calcutta, I have no doubt, that if some expense were employed by Government in improving its localities by filling up private tanks, digging proper ditches and public Tanks, in clearing away the low jungle, and improving the high way and bazars, this might be rendered not only perfectly salubrious, but greatly more so than Calcutta itself—a residence of two rainy seasons upon this side of the River, and the experience of old inhabitants, convince me, that those houses in particular, which are built on the steep Western bank, are peculiarly favored during the hottest season of the year, viz. from April to October, enjoying, as they then do, the South-east breeze, purified as we may suppose by its passage over Calcutta, from the marshy miasmata of the Sunderbunds, freed from dust, and cooled by its passage across the River. These houses in fact are, or may be considered, Sanatarium, and are used as such by many persons from Calcutta."

In confirmation of the above, Dr. Strong, the Surgeon of the 24-Pergunnahs observes:

"In and about Calcutta, among the causes of unhealthiness, are the number of small dirty Tanks, and the large Drains from which the water does not run off—examples of these may be seen in every direction, but particularly along the Circular Road, the Boitakanah Road, and the Roads in and about Entalee and Sealdah. To those may be added the numerous holes or Tanks of shallow water which fill in the rains and stagnate in the dry weather. To remove these causes of Malaria it would appear necessary, that the drains should be kept in a clear state, so that the water should run off at once, and as to the holes or small Tanks they should be filled up."

"It is not easy to point out what this nuisance, or Malaria, is, but the state of the soil has much to do with it: it is known to be formed in marshy or undrained spots, in wet woods, and in moist meadows, and the low and dense brushwood jungle, or thickets of reeds, or grass, so common in India, being the residence of moisture and decaying vegetation, is analogous to marsh lands and must produce much."

I conceive that putting out of question the Sundurbunds and the Salt Water Lake, that the thickets of trees and jungle woods, pools, small stagnant tanks and jeels, which every where abound on each side of the Road, down from Chowringhee, Breejeetollah, to the end of Russapuglah, on each side of the Kalleeghaut Road on to Tolly's Bridge, on each side of Tolly's Nullah and the Road on the right of this Nullah, as far as the Insane Hospital, where the eye can hardly find any equality of surface, except on the Jeels and Tanks, and where the wild indigo and noxious weeds are growing in all directions; all this being situated South of the Presidency must be a constant source of disease, and disorders, many of which would vanish, if this pestilence could be removed; and, if I am not mistaken, I can trace illness from this very source (these weeds) to certain houses in Chowringhee, where occasionally in uninhabited houses, the compound, and round the Tanks, is to be found jungle weed, which must add to the Malaria, which is blown from the Russapuglah jungles over the Chowringhee part of the Presidency.

"I have heard it said, that this Lake, or marsh, was capable of being drained, and the lands redeemed and brought into cultivation; moreover, that it would probably be very valuable land for the cultivation of indigo, rice, and other products, the question of

draining, however, is one which belongs more to the province of a Surveyor to decide, and upon which I am unable to form any correct opinion."

In conclusion, I have the honor respectfully to solicit, that in the event of any of these undertakings being sanctioned, Government will be pleased to relieve me of a portion of the responsibility attached to them, by associating with me one or more members of the Lottery Committee, whose sphere of exertion at the present moment is unhappily very limited and contracted. I do not prefer this request from any desire to rid myself of a little additional labor, but Government is already aware, that besides the ordinary duties of my office, and the usual works attended to annually at this season in the Suburbs of Calcutta, I have this year to superintend the repairs of the Benares Road for a distance of 30 miles—half that extent of the Diamond Harbour Road, and the whole distance of the Road leading to Budge-Budge. I also trust, that in the perusal of the statements of the medical men on the subject of Drains and Ditches much blame will [not] be imputed to me by Government, as it is well known, that the means at my disposal are altogether inadequate to the maintenance of an efficient and satisfactory Drainage of the Suburbs.

FOUZDARRY ADAWLUT,
SUBURBS OF CALCUTTA,
The 31st October, 1828.

I have, &c.
(*Signed*) J. MASTER,
Magistrate

P. S.—I have the honor to request, that the map of the Suburbs may be returned when no longer required.

No. 51. *f.*

No. 2582.

To J. MASTER, ESQ.

Magistrate of the Suburbs of Calcutta.

Judicial Department

SIR,

The right Honorable the Governor General in Council has had under his consideration your Report, dated the 3d Instant, submitting your sentiments on the measures best calculated to remedy the unhealthiness of the Suburbs of Calcutta.

2. His Lordship in Council regrets, that the necessity of strict economy prevents his authorizing any considerable immediate outlay from the public Treasury, in furtherance of the very important object of improving the salubrity of the Environs of the City. It only remains therefore, to consider, how far it may be practicable to supply the Allypore Jail with convicts from the Jails in Bengal for the purpose of making such of the Improvements you have suggested as can be carried into effect by the labor of convicts.

3. It occurs to his Lordship in Council that prisoners now under sentence of banishment to the number of twelve or thirteen hundred in the Jails within the divisions of Moorshedabad, Dacca and Calcutta, might be transferred to the Allypore Jail under the orders of the Nizamut Adawlut, and the Court will accordingly be consulted on the propriety and expediency of adopting the measure.

4. The map which accompanied your report is herewith returned.

COUNCIL CHAMBER,
The 27th November, 1828.

I am, &c.
(*Signed*) H. SHAKESPEAR,
Secretary to Government.

No. 51. *g.*

No. 2588.

To W. H. MACNAGHTEN, ESQ.
Register af the Nizamut Adawlut.

SIR,

With reference to the 3d paragraph of my letter to you, under date the 25th of September last, I am directed by the Right Honorable the Governor General in Council to transmit to you, to be laid before the Nizamut Adawlut, the accompanying copy of a Report from the Magistrate of the Suburbs of Calcutta, dated the 3d Instant, together with copy of a Letter this day addressed to him by order of Government, and to request the sentiments of the Court on the suggestion contained in the concluding paragraph of that letter.

I am, &c.

COUNCIL CHAMBER, *The 27th November*, 1828.

(*Signed*) H. SHAKESPEAR, *Secretary to Government.*

No. 51. *h.*

To THE SECRETARY TO GOVERNMENT,
In the Judicial Department.

SIR,

Nizamut Adawlut — Present.
W. Leycester, *Chief Judge.*
A. Ross, C. T. Sealy, Esqrs.
R. H. Rattray, *Puisne Judge.*
M. H. Turnbull, Esq. *Officiating Judge.*

I am now desired by the Court of Nizamut Adawlut to acknowledge the receipt of your letter, under date the 27th of November 1828, and its enclosures, and to state, with reference to the 3d paragraph of your letter to the address of the Magistrate of the Suburbs of Calcutta, that the whole of the Magistrates and Joint Magistrates, in the divisions of Moorshedabad, Dacca and Calcutta, were called upon to state the number of prisoners which might be transferred from their Jail to the Jail of Allipore.

All the Returns* being now received, it appears that the entire number available for the purpose specified, does not much exceed 100 from all the Districts; and as the number required at the Presidency was 12 or 1300, his Lordship in Council will probably agree with the Court, that it would not be expedient to transfer to Allipore the comparatively small number of convicts available from the Districts originally destined for their places of banishment.

In explanation of the delay which has arisen in procuring information on the subject I am desired to observe, that it is chiefly ascribable to the confusion which in some measure ensued in consequence of the transfer of the Records from the Courts to the Commissioner of Circuit.

I have, &c.

FORT WILLIAM, *The 8th January*, 1830.

(*Signed*) W. H. MACNAGHTEN, *Register.*

* NOTE.—Owing, as stated by the several Magistrates from whom Returns were received, to the paucity of convicts, and to their being fully employed in the various Districts where they are located, in removing jungle and in constructing and keeping in repair Bungalows, Roads, Bridges, Tanks, Drains, and other Works of public utility.—J. M.

No. 51. *i.*

Extract from a Letter from F. O. Wells, Esquire, Magistrate of 24-Pergunnahs, dated 8th January 1835, to W. H. Macnaghten, Esquire, Secretary to Government of Bengal.

"3. I take this opportunity of submitting for the information and orders of the Governor General in Council, a copy of a letter received from certain inhabitants of Allipore and Kidderpore, soliciting the establishment of a Hospital in the Suburbs.

"4. During the last six months the number of sick and destitute has certainly been very great indeed. I am of opinion, however, that the cause of so large a number is temporary and extraordinary, and one that may not occur again for years If, however, the Government should see fit to establish a Dispensary for the relief of the sick and supply of medicines to such persons, it would prove of the greatest use to the poorer inhabitants.

"5. The country to the Southward is occasionally very unhealthy, and the sick being unable to work, crawl up towards Calcutta in hopes of attracting the attention and obtaining the charity of their more fortunate countrymen ; a Dispensary for the relief of such parties, where a small quantity of food was given in cases of sickness, would indeed prove a source of great benefit.

"6. I have no doubt that a portion of the expense might be defrayed by subscription if the Government would afford their support to the Institution, say 250 Rupees per mensem, to be disbursed and managed by a Committee appointed for that purpose

"7. The situation ought to be near Kidderpore and Allipore."

No. 51. *i.*[1]

To F. O. WELLS, ESQ.
Judge and Magistrate of the 24-Pergunnahs.

Sir,

We the undersigned Residents of Allipore and Kidderpore, beg leave to represent to you, that we have observed on frequent occasions, with pain and regret, the dreadful mortality that prevails at times, more especially amongst the poorer classes of the Natives in this populous part of the country, who in most instances fall victims to their maladies from there not being any public Institutions to which they can resort for relief. Most of the people are too poor to obtain assistance from the Native doctors, who in general from their rapacity and ignorance, do more harm than good—consequently several deaths occur daily during the sickly seasons, which in a great measure might be prevented if you would kindly recommend and prevail on Government to establish with its usual humanity, a Hospital and Dispensary at Allipore, to afford Chirurgical and Medical relief to those persons who might require it. The expense, we presume, would be inconsiderable, and by no means commensurate to the blessings diffused, and as the present benevolent Government has established, at considerable expense, Institutions for the intellectual improvement of its

native subjects, we confidently hope it will not be averse to accede to the establishment of a Hospital and Dispensary at Allipore for the relief and preservation of the numerous poor at that place—Kidderpore and the neighbourhood.

We have, &c.

(*Signed*) A. ROGERS,
,, J. KYD,
,, G. DACOSTA,
,, R. MORTIMER,
,, SUTT SHURN GHOSAUL,
,, J. TEIL,
,, W. GREENAWAY,
,, JNO. CAMPBELL.

ALLIPORE AND KIDDERPORE :
17th December, 1834.

No. 51. *j*.

No. 1266.

To J. H. PATTON, ESQ.,
Magistrate of the 24-Pergunnahs.

SIR,

I am directed by the Hon'ble the Governor of Bengal, to transmit to you copies of the documents noted in the Margin,* and to request that you will submit† to Government, any observations on the subject treated on in those papers, which you may deem it proper to offer.

I have, &c.
(*Signed*) R. D. MANGLES,
Secy. to the Govt. of Bengal.

FORT WILLIAM :
The 16th June, 1835.

* Letter from the Governors of the Native Hospital at Calcutta, dated the 1st instant, on the subject of establishing a Fever Hospital in this city.
Resolutions of the Governors of the Native Hospital of a special Meeting held on 20th ultimo.
Mr Surgeon Martin's Topographical Notes on the state of Calcutta and its Suburbs.
Ditto additional Explanatory Note.
An Extract—Introductory Essay from Dr. Allison's History of Medicine

† For reply to the above Letter, See Appendix (B) page 4 to the Municipal Committee's Report.—J. M.

No. 51. *j*.(1)

Extract referred to in the Paper marked No. 51. j.

In the Introductory Essay by Dr. Allison, on the History of Medicine prefixed to the Cyclopædia of Practical Medicine for December 1834, I find the following commencement to the second Chapter—

" Next to the additions which have been made since the end of the last century, to our knowledge of physiology we may place the numerous important observations by which our information as to the *external causes* of disease has been rendered more extensive and precise. These observations, and the inferences from them, demand the more attention from physicians, that they necessarily involve a kind of evidence essentially different from that on which we proceed in other medical enquiries. And if we dost hope that the progress of human wisdom and virtue would bear any proportion to that of human knowledge, we might expect that the lessons to be drawn from the enquiries would prove of even greater

consequence to the future happiness of mankind than any which we can gather from the history and treatment of diseases.

"These enquiries have, in some instances, been prosecuted by individuals in civil life; but the opportunities of making decisive observations on some of the causes of diseases, which occur in the experience of Medical Officers of fleets and armies, are much superior to those which other practitioners enjoy, and the peculiar nature of such observations has never been so well understood as during the last war"

True Copies.

JUDICIAL DEPARTMENT
The 16th June, 1835.

(*Signed*) R. D. MANGLES,
Secy. to the Govt. of Bengal

True Copies.

J. H. PATTON,
Magistrate.

No. 52.

No. 348

To THE HON'BLE SIR J P. GRANT, *Knight*
Chairman of the Fever Hospital and Municipal Committee
Calcutta

HON'BLE SIR,

I have the honor to acknowledge the receipt of your Letter No. 1088, dated the 10th instant, and in compliance with the request contained therein, annex a Statement of Deaths that have occurred among the Native population of the Town of Calcutta during the months of January, February, March, and April last, prepared from the records of the Office of the Superintendent of Police, from which it will be seen, that the deaths among the Hindoos during the above period amount to 6,090, and Mahomedans, 2,824, making a total of 8,914, which averages at 2,228½ per month.

2nd. I beg to apologize for the delay that has occurred in furnishing you this information, and regret it is not in my power to give a more complete statement exhibiting the mortality among all denominations of the inhabitants of the Town. The Return I now forward has been compiled from the Registers kept by the Police, at the two Hindoo Burning Ghâts, and the Mahomedan Burial grounds; and its correctness may be generally depended upon as regards the total number of deaths, but the classification, except in cases of small-pox, may perhaps be questionable. I should also observe, that the bodies of the opulent and the more orthodox Hindoos, are sometimes taken for cremation to the "Kalee Ghât," but these instances are rare, and would hardly affect an average of deaths

I have the honor to be,
Honourable Sir,
Your most obedient Servant,

CALCUTTA, POLICE OFFICE:
16th August, 1844.

J. H. PATTON,
Chief Magistrate

No. 52. a.

Statement of Deaths among the Hindoo and Mahomedan population of the Town of Calcutta.

Months.	Hindoos. By Small-pox.	By Cholera.	By other complaints.	Total	Mahomedans. By Small-pox.	By Cholera	By other complaints.	Total.
January 1844, ...	91	358	502	951	66	110	166	342
February, ...	240	692	383	1,315	215	406	170	791
March ..	548	659	347	1,554	415	270	128	813
April, ...	493	1,440	337	2,270	263	491	124	878
Total.	1,372	3,149	1,569	6,090	959	1,277	588	2,824

J. H. PATTON
Chief Magistrate

No. 53.

Committee for improving the Town of Calcutta.

To HIS EXCELLENCY THE MOST NOBLE RICHARD, MARQUIS WELLESLEY, K. P

Governor General in Council &c &c &c

MY LORD,

In the Letter* which we addressed to your Excellency in Council, under date the 4th instant, we had the honour to state that we had selected Special Committees to consider in the first instance the measures which should be adopted for improving the Town of Calcutta and its vicinity, and for raising the Funds required for those purposes. *See App. (F.)

2nd. The Committee selected for the last mentioned purpose has since furnished us with a Report on the subject, in which they propose as follows—

First. "That the Assessment within the Town of Calcutta be raised on all houses the "rent on computed value of which shall exceed one Rupee per mensem, from 5 to $7\frac{1}{2}$ per "Cent,"

Estimated Produce Rs. 50,000.

Second. "That the surplus Revenue of the Canal, commonly known by the name of "Tolly's Nullah, be applied to the improvement of the Town and vicinity of Calcutta."

Estimated Produce Rs. 30,000.

Third. "That the Fees of Office collected by the Magistrates of Calcutta be appro- "priated to the same purpose,"

Estimated Produce Rs. 10,000.

Fourth. "That the same application be made of the surplus Revenue arising from the "Markets within the Town of Calcutta and Fort William,"

Estimated Produce Rs. 5,000.

Fifth. "That the Surplus Receipts of the Court of Requests be appropriated to the "discharge of the expense of the projected Improvements"

Estimated Produce Rs 10,000.

Sixth. "That an annual Lottery be established for the same purpose, under proper management and control,"

Estimated Produce Rs. 60,000.

ABSTRACT

" Increased Assessment,	Rs.	50,000
" Tolly's Nullah,	,,	30,000
" Fees, &c. &c.	,,	10,000
" Surplus of Bazars,	,,	5,000
" Do of Court of Requests,	,,	10,000
" Annual Lottery,	,,	60,000
	Sa Rs.	1,65,000

3rd. Whilst we profess to concur generally in the sentiments of the Special Committee, we think it necessary to offer the following remarks to the consideration of your Excellency in Council, to enable you to form a more accurate judgment on the subject.

4th. The first resource suggested by that Committee is a qualified increase of the Tax on houses within the Town of Calcutta from 5 to 7½ per Cent.

5th. On a reference to the Act of Parliament passed in 33rd year of His Majesty's Reign, it does not appear to us that any objections exist to the proposed increase of Assessment, at the same time we are of opinion, that the Funds so raised must be exclusively "applied" (to borrow the terms of the Act) "to the cleansing, watching, and repairing of streets," and that the amount cannot properly be diverted to any other objects of Improvement. It does not, however, appear to us that this restriction will be felt as an inconvenience by Government or by the public, as considerable Funds will necessarily be required for purposes falling strictly within the intent and meaning of the Act of Parliament, particularly that of improving the present very defective plan of draining the Town.

6th The next object which we shall notice from the Report furnished by the Special Committee, is the plan of raising Sixty Thousand Rupees per annum by means of a Lottery

7th. We are aware of the objections which are usually urged against raising supplies in that way, but whatever force those objections may have in other countries, it does not appear to us that any ill consequences are likely to result from the establishment of a Lottery in India. The habits and confined means of the lower orders of the Natives, effectually excludes them from any participation in a Lottery conducted on a large scale. Even in England the evil does not arise so much *from* the purchase of tickets as from the Offices which are opened for ensuring them, which would of course be entirely prevented in this country.

8th. At all events, if Lotteries be necessarily injurious to the morals of the people, the evil is at present experienced in Bengal in as great a degree as it could be if the plan now proposed by us were to be adopted, as Lottery tickets are regularly sent round for sale from Madras.

9th. The remaining supplies suggested by the Special Committee do not constitute new resources, but either do now, or shortly will, form a part of the general Revenue of the State. It does not, however, appear to be less advisable on that ground to adopt the proposition of the Committee.

10th. Supposing Government to contribute to the expense of the projected improvements, it appears to us to be extremely desirable that certain Funds should be considered to be exclusively applicable to that purpose. On a reference to the different resources specified by the Committee, it will appear that they have either been recently established, or that they do not yet form a part of the actual Revenue of Government (as is the case with

Tolly's Nullah.) In either case we should presume that little inconvenience would arise from the proposed application of them to the projected improvement of the Town.

11th. Considering, however, the extensive nature of those improvements, it appears to us that it will be necessary for Government either to set apart further Funds for the purpose in question, or to advance a considerable sum during the next two or three years, to be gradually liquidated from the different supplies now proposed in the plan which we have the honour to submit.

12th. Impressed as we are with a full sense of the substantial benefits which the community will derive from the Improvements in contemplation, but at the same time sensible that those Improvements cannot be carried into effect without considerable expense, we anxiously wished to suggest adequate resources for that important object, but the restrictions existing by law on raising taxes within the Town of Calcutta have precluded us from submitting to your Excellency in Council so comprehensive a plan as we could have wished, for the purpose of providing effectually for the discharge of the expense of the Improvements, which (as we have already intimated) we consider to be essential to the convenience and health of the inhabitants of this populous City.

13th. In addition to the Report above alluded to, we have likewise received a Report from the Committe selected by us to consider the means best calculated for improving the Environs of the Town of Calcutta, containing the following remarks and suggestions:

First, "That the Road leading from the premises occupied by Mr. Logan along "Garden Reach and Watson's Wall to Surman's Bridge be widened, that the Ditches be "cleared, and that such Drains and Bridges be constructed as shall on a survey appear to "be necessary for keeping the road free from water at all seasons of the year. From "want of such Drains and Bridges a part of the Road is frequently inundated during the "season of the rains. The stagnant water lying on the side of the Road is offensive to "passengers, and must be injurious to the health of persons residing in that neighbour-"hood. In consequence likewise of the narrowness of the Road, and the abrupt turning "near the premises belonging to Colly Sunker Goshaul, that part of the Road is not free "from the danger to passengers—the house on those premises should at all events be taken "down, for, so far as a judgment can be formed without an actual survey, it would appear "to be in an insecure and dangerous state."

Second, "That a survey be made of the ground and villages lying between the old "and new Roads leading to Garden Reach, and between the latter Road and Allypore, "with the view of determining what improvements can be made in those suburbs."

Third, "That the exact limits of the Road leading from Surman's Bridge round "Allypore to the Allypore Bridge be ascertained, and that all encroachments be removed, "and that Posts or other marks be fixed to define the limits in future."

Fourth, "That the Cantonments of the Calcutta Native Militia be removed—those "Cantonments are felt as a sensible nuisance by every person riding or walking round the "Allypore Road; the Road itself is otherwise calculated as much or perhaps more than any "other, to become the general resort of persons taking the air during the mornings and even-"ings. We have the less hesitation in recommending the adoption of this measure, as we "conceive that the house and ground might be immediately appropriated to some public "purpose, as for instance a Cutcherry for one of the public offices, which would com-"pletely indemnify Government for the expense of removing the above-mentioned corps "to some more convenient situation. It has been suggested to us that material advantage "would arise from removing the Cantonments to the vicinity of the Jail of the 24-Pergun-"nahs."

Fifth, "That the Ground lying on both sides of the Road near to the house occupied by "Mr. Brooke, down to Allypore Bridge, be purchased on account of Government, and that "the houses be removed. We have the less hesitation in recommending this measure, as we

"understand that Government has long had it in contemplation to purchase the Ground in "question, as appears from the papers annexed to this Report. In the last and former years "considerable inconvenience was experienced during the season of the rains from the pools "of stagnant water on the ground to which these remarks allude. By purchasing the Ground "and putting it in order by the labour of the convicts, and with the excavations which must, "at all events, be made from the Nullah; and afterwards by disposing of the property under "restrictions, or applying it to some public purpose, it is presumable that the ultimate "expense to Government will be very inconsiderable."

Sixth, "That the Ground lying to the Southward of the General Hospital be levelled, "and the holes filled up with earth to be excavated from the Nullah. The bad state of "the Ground lying between the Hospital and the Nullah has been more than once the "subject of representations to Government, as being injurious to the Invalids and Conva-"lescents in the Hospital. To remove that inconvenience effectually, further measures "besides that immediately proposed, may be necessary. For the attainment of that object "it was formerly proposed to make a cut from the Nullah not far from the Allypore Bridge "through the Ground lying at the back of the Hospital. It has likewise been suggested "to dig one or more large Tanks in that neighbourhood; but as the present is not the season "of the year for carrying into effect works of that nature, and as the proposed cut appears "to us to require mature consideration, we deem it sufficient to recommend that the "Ground be levelled as far as may be practicable in the manner above suggested. With "respect to the execution of that work, we conceive that the earth should be excavated "during the time of the ebb, and carried away to the proper places by labourers and carts "during the flood tides, when the men cannot be employed in excavating the earth. It "appears to us that a considerable body of convicts might conveniently be employed in the "execution of this work."

Seventh, "That a Road be made from near the Hospital to unite with the Russa-"pugla Road, about a mile above the Bridge near Brijoo Talow, in a direction nearly West "and East."

Eighth, "That the Road mentioned in the preceding Article be intersected by a Road "from near the Hospital to Cally Ghaut, both of those Roads would be of material con-"venience to the Natives."

Ninth, "That the Russapugla Road from Girryah Haut to Birjoo Talow be repaired, "the exact limits of the Road ascertained, all encroachments removed, and (whenever "necessary) additional Ground be purchased for widening the road. By the present "almost impassable state of that Road the value of several considerable houses at Russa-"pugla is greatly depreciated. The Road is likewise one of the principal avenues for the "importation of Articles for the daily consumption of the Town."

Tenth, "That a Road be made from Russapugla through Baloogunge to unite with "the great Circular or Boitacaunah Road near the European Burying Ground. By those "measures, wood and other articles brought from Russapugla might enter the populous "part of the Town without passing over the Esplanade or the principal parts of the Town "occupied by European Gentlemen, as is the case at present."

Eleventh, "That the Bally Ghaut Road be widened. That Road is at present much "too narrow for the number of people, hackaries and bullocks, which are constantly passing "along it."

"It may tend to assist the judgment of the General Committee, and to facilitate the "final decision of Government with respect to the improvements above suggested, to state "the order in which, according to our judgment, those improvements should be carried into "effect, and the preparatory steps necessary for the attainment of that object."

"As the expense required for the Improvements mentioned in the First, Third, and "Fifth Articles of this Report will not be considerable, and as the season of the year

"renders any delay inconvenient, we are of opinion, that the projected improvements men-"tioned in those Articles should be immediately carried into effect. Early measures should "consequently be taken for obtaining the Ground requisite for those purposes, and adjust-"ing the compensations to the proprietors and tenants."

"In like manner we are of opinion, that convicts should be employed as soon as possi-"ble to excavate the Nullah near the Hospital, with the view of giving effect to the Plan "suggested in the sixth Article, and that a professional Gentleman should be desired to Re-"port what further assistance may be required of coolies or hackaries for carrying the pro-"jected improvement into execution."

"The removal of the Corps commanded by Major Downie (Article 4th) must neces-"sarily depend upon the acquisition of another spot of Ground for the Cantonments of that "Corps."

"Immediate measures may be taken for marking out of the Roads (mentioned in the "7th, 8th, 9th and 11th Articles), and forming an Estimate of the expense required for "making the Roads. Some delay must necessarily be experienced in the adjustment of "the latter point."

"The improvements of Bally Ghaut Road (Article 11th) might be suspended until the "other objects shall have been partly carried into effect."

"Exclusive of the abovementioned objects, other improvements will probably occur "to us, which we shall hereafter have the honour to state to the General Committee. We "have particularly adverted to Plans which have been suggested of making a cut from "Tolly's Nullah around the great Circular or Boitacaunah Road, and of conveying it out to "the Salt Water Lake: many advantages would certainly attend that Plan. At the same "time we are apprehensive that it is liable to considerable objections. At all events we "have thought it advisable to suspend our judgment upon that point until we shall have "been furnished with the Report of the Special Committee for improving the Drainage of "the Town, the two objects being naturally connected with each other."

14th. The foregoing remarks being for most part sufficiently explanatory of the improvements proposed by the Special Committee, we only deem it necessary in a very few instances to trouble your Excellency with any additional observations on the subject.

15th. By the 10th Article of that Report it is proposed to construct a Road from Russapugla through Balloo Gunge, to unite with the Circular Road opposite to the European Burying Ground.

16th When we consider the large daily supplies brought into the Town from that quarter, and the great advantages which would be gained by conveying those Articles of consumption into the populous parts of the Town by the nearest possible route, we cannot but be sensible that such a Road would be attended with much public convenience.

17th. At present, however, we would rather recommend that the Road proposed by the Committee in the 7th Article of their Report, should be carried on through Balloo Gunge to unite with the great Circular Road opposite to the Burying Ground.

18th. A Road in this direction would be productive of several advantages, and would answer many of the purposes of the Road proposed by the Special Committee in the 10th Article of their Report, and the expense would be less considerable, as the Ground required for the site of this Road is for the most part, the property of Government.

19th. The advantages which would be attained by the removal of the Cantonments of the Calcutta Native Militia, to the vicinity of the Jail of the 24-Pergunnahs, have attracted our particular attention, and in the course of our enquiries we have found strong reason for recommending this measure.

20th Disturbances have occasionally occurred amongst the prisoners confined in this Jail, and upon a recent occasion when the number of persons confined exceeded nine

hundred, the Military Guard stationed for their protection and the security of the Jail was comparatively so inconsiderable, that the most serious consequences might have arisen had the prisoners acted with concert and unanimity.

21st. The recurrence of any similar danger will, we conceive, be best obviated by fixing the Head Quarters of the Calcutta Native Militia in the vicinity of the Jail.

22nd. An opportunity now offers to purchase a piece of Ground with a tolerable house at Russapugla, which we conceive to be peculiarly well adapted for the purpose of constructing the Cantonments in question, and we do ourselves the honour to submit a plan of this Estate for your Excellency's consideration.

23rd The place is reported to us to consist of 60 Biggahs of Ground, and if a large space should be deemed requisite, a considerable addition may be made by purchasing and annexing to it the Ground lying between this Estate and Tolly's Nullah, which we conceive may be obtained upon reasonable terms.

24th. By those means the Cantonment would be bounded on one side by a running stream, which would contribute essentially to the health, comfort, and cleanliness of that corps.

25th. Should any objection however be urged against purchasing the ground now suggested by us on the score of insufficiency of space, we beg leave to state, that another house and a piece of ground consisting of one hundred and eighty Biggahs, and situated in the vicinity of the Jail, are advertised for sale, which we conceive would answer all the purposes that may be required.

We have the honor to be, &c.

CALCUTTA,
30th July, 1804.

(Signed) W. N. CAMERON,
,, C. BUCHANAN,
,, CR. GREEN,
,, J. TAYLOR,
,, R. H COLEBROOKE,
,, JNO. SHOOLBRED,
,, D. BROWN,
,, G. DOWDESWELL
,, THOS. PRESTON,
,, THOS. GRAHAM,
,, MERRICK SHAWE,
,, THOS. ANBUREY,
,, W. C. BLAQUIERE,
,, ED. THORNTON,
,, ALEXANDER RUSSELL,
,, WM. FAIRLIE,
,, RICHD. BLECHYNDEN,
,, J. J. B. PROBY,
,, T. COLEBROOKE,
,, J. ALEXANDER,
,, H. ST. G. TUCKER,
,, THOS. DASHWOOD,
,, S. DAVIS,
,, CHAS. F. MARTYN,
Compd. J. W. ,, M. G. PRENDERGAST.

(True Copy.)
CECIL BEADON,
Under-Secretary to the Government of Bengal.

No. 54

No. 3044.

To THE CHAIRMAN AND MEMBERS OF THE COMMITTEE FOR IMPROVING THE CONSERVANCY OF INTALLEE.

GENTLEMEN,

The Municipal Committee are desirous of knowing if there are any subjects recorded in the Intallee Committee's Proceedings in the shape of Reports or Minutes and Correspondence with the Government, which are likely to be of use in framing a report on the Suburbs. The Committee have directed me to request the favour of your answer on the above point. The Committee will also be obliged by your stating if the records of the Proceedings of the Intallee Committee, of which Messrs. Jessop, Wilson, and Beeby were the Members, have been preserved, and from where they may now be obtained: the Committee are desirous of referring to those records to complete certain information in their possession.

I have the honor to be,
Gentlemen,
Your most obedient Servant,
(Signed) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE, TOWN HALL.
7th March, 1846.

No. 55.

To JAMES MORRIS, ESQ.

SIR,

Your Letter of the 7th March has been received and submitted to the Chairman and Members of the Intally Conservancy Committee, and in reply I am authorized to forward to you, for the information of the Municipal Committee, the accompanying copy of a Letter addressed by the Intally Conservancy Committee to the Civil Architect of Fort William, and by him submitted to Government in 1841, but to which no reply, beyond a general acknowledgment, has been received.

With respect to the records of the Proceedings of the old Committee, of which Messrs. Jessop, Wilson, and Beeby were Members, the Committee desire me to say, that they never came into the hands of this Committee, although many attempts were made to get possession of them. They cannot be found, and are supposed to be buried amongst the old records of the Magistrate's Office, 24-Pergunnahs, under whose care the Roads then were.

I have the honor to be,
Sir,
Your most obedient Servant,
W. B. SMITH,
Honorary Secretary, Intally Conservancy Committee.

INTALLY CONSERVANCY OFFICE:
21st April, 1846.

No. 55. *a.*

To CAPTAIN W. R. FITZGERALD,
Civil Architect, &c. &c. &c.

Intally, 9th February, 1841.

Sir,

1 Intally Conservancy Committee's Chairman's Letter to Captain FitzGerald, dated 19th February 1840
2. Captain FitzGerald's Letter to Mr. Secretary Halliday, No. 383, dated 27th February 1840.
3. Mr. Deputy Secretary Young's reply, No 760, dated 20th April 1840
4 Capt. FitzGerald's Letter to Chairman of Intally Conservancy Committee, No 17, dated 5th May 1840.

In advertence to the letters noted in the margin, all of which have reference to the transactions of the Intally Conservancy Committee for the year 1839, I have now the honour to address you on the same subject for the past year 1840.

The Committee have continued to labor unceasingly during the past year in endeavouring to improve the Roads and Drains of the Division committed to their charge, in which endeavour they have not been so successful as they had hoped, for the following reasons :

The number of convicts, which in my letter as per margin, dated 19th February 1840, was fifty-four (54) at that date, has since been reduced so low as forty-two (42), and although fifteen (15) have been lately added, the number remaining, viz seventy-six (76) nominally, but really only sixty-one (61), after deducting the number required for jail duty, sick, &c. is quite inadequate to the performance of the duties of the extensive district under the charge of the Committee. Not less than one hundred and twenty (120) effective convicts are absolutely necessary to keep the Drains and Roads clear throughout the year, and even this number is insufficient during the rains Should it happen that convicts are not available in whole or in part for these duties, the Committee beg to suggest that Dongah Coolies be employed in their room. The Committee venture respectfully but urgently to press upon the attention of Government the necessity of sanctioning this measure as they will otherwise be unable to perform the duties they have undertaken with satisfaction to themselves or advantage to the district committed to their care. This subject was brought to notice in our letters to your address, dated 17th [? 19th] February 1840.

Another matter noticed in my Letter of 1840, has been found during the past year to press heavy on the Committee. I allude to Overseer Sergeant Dyson, whose services are frequently required by the Magistrate of the 24-Pergunnahs in distant parts of the division, on other and distinct duty as a Constable or Petty Officer of [the] Allipore Court, to hold investigations &c.—During [the] Sergeant's absence his duties as Overseer of the Roads are neglected, and the instructions of the Committee unattended to ; without any [blame] attaching to the Sergeant. The Committee beg respectfully to urge that the extensive district under their charge requires the undivided attention of an active Overseer, as well as the vigilant inspection of the Members of the Committee, who are unable to do more than inspect and direct his labours, and those of the convicts under his superintendence.

The Ghowkhannah premises having been completed, the carts and bullocks have been housed therein since the 17th instant, and the rent (8 Rs. per mensem) paid for the former sheds has ceased accordingly.

The Committee notice with regret, that although the Conservancy bullocks are generally in good condition two or three occasionally fall ill, and the same number of carts are accordingly thrown out of work. The Committee would solicit an increase in the number of bullocks on this account, but if the request contained in the following paragraph be complied with, this will be unnecessary.

Rubbish, excellently well suited for repairing and preserving the Roads may frequently be obtained without payment by sending carts to take it away from the compounds of

houses under repairs, &c., but this is always required to be done *immediately*, and if not done by the Committee, private individuals are glad to avail themselves of the offer: much good material is thus lost to the Roads, for it rarely happens that the Conservancy carts can be spared to bring away more than one load a day.

The Committee beg to suggest, that it would greatly improve the Roads and diminish the amount of their annual estimates for khoah if five box-carts, with two bullocks each, were allowed for this purpose, and also to provide for sickness, as stated in the preceding paragraph. These carts and bullocks when not required to convey rubbish might be advantageously used in the district in aid of the present establishment which is not at all times equal to the demand made upon them. They might also be used for the Roller instead of hired bullocks, and thus save considerably in that item of annual expenditure. I herewith enclose an estimate of the expense of making the additional carts and buying and feeding the bullocks.

The Drains of the district continue to occupy the anxious attention of the Committee: each of my annual letters to your address have prominently noticed this serious subject. There is no system of Drainage, the levels of the Drains bear little or no reference to each other; and from want of means, the Committee are unable to do more than keep them open, and by raising some and depressing others, to induce the water and other liquids that come into them, to flow from one Road side to another, through gardens or fields or across Roads or pathways, such being their present course as stated in my letters to your address of 1839 and 1840. The Committee do not expect Government to incur the great expense of surveying the present course of the Drainage and recasting the whole, but if a sum of two thousand Rupees (2,000) per annum were allowed towards improving the Drainage, much might be done by the Committee, aided by your scientific knowledge and advice. If some plan be not adopted the evils which arise from the annual inundations of parts of Intally must continue, and in some severe season the lower parts of Calcutta even will be inundated from the stoppages of the passages in Intally, into which the Calcutta Drains empty themselves. Want of proper passages for such masses of water, and of labourers to keep them open, must be attended with the above results sooner or later—the whole of the Marhatta ditch being included in the Intally division, and into this ditch many of the tunnels and Drains of Calcutta empty themselves. The Committee beg to suggest that if coolies or many more convicts cannot be immediately allowed to them, that this ditch should be placed under the care of the Town Conservancy, which has a large establishment (on the Intally Bank of the ditch), and is better able to take care of this large ditch than the Intally Committee, with its limited means.

The Committee are encouraged to hope that the above suggestions will meet with the favourable consideration of Government in accordance with paragraph third of Mr. Deputy-Secretary Young's Letter to your address, No. 760, dated 28th April 1840.

In the fifth paragraph of the same letter, Mr. Deputy-Secretary Young calls upon the Committee to draw up such plan for local taxation and management as their knowledge of the district may suggest to them as most likely to be acceptable to the inhabitants and effective for the purposes in view. In furtherance of this object, I have the honour to subjoin a plan for the consideration of the Right Honourable the Governor of Bengal, which, if adopted, will, amongst others, embrace the following subjects, but if not adopted, or if much delay in its consideration and final adoption be anticipated, the Committee beg to submit the following as substantive propositions, and to solicit the sanction of Government thereto.

The Committee to have power to levy a fine not exceeding ten Rupees (10) on any person who shall without permission, place bricks, lime, sand, or other materials on the Roads, and refuse to remove the same when so required, thereby obstructing the free passage of the said Roads, and setting at defiance the remonstrances of the Committee.

The Magistrate to be instructed in case of contumacy to enforce payment of such fines with an additional fine not exceeding double the original amount, or otherwise support the authority of the Committee in such manner as may be deemed proper.

Also a similar power to fine or otherwise punish persons found cutting up the public Drains or bunding them for fishing or other purposes, or committing filthy nuisance on the Roads or in the Drains, or erecting temporary shops, or exposing goods for sale on the Roads so as to obstruct free passage on the same.

A Pound to be established at Intally Conservancy Ghowkhanna—there being no Pound nearer than Allipore—into which cattle found trespassing may be placed—with power to levy the usual fines, and under the same rules as obtain at Allipore Pound. The Pound to defray its own expenses.

The Committee to have power to fill up offensive pools or tanks, and to cut down trees or jungle growing in, or hanging over the public Drains or Roads.

In addition to the present establishment the Committee recommend the following as necessary to enable them to conduct the business of the Division under their charge.

A Clerk or writer at 60 per mensem, two Durwans for Ghowkhanna gates, at 5 each, ditto six Maters or sweepers for the Drains of the division to perform duties which neither the convicts nor the drivers will execute, at 4 per mensem.

I have the honour herewith to forward a Statement of the expenditure of last year, exhibiting a saving of Company's Rupees 42 : 14 : 5 on the estimate. Also an Estimate for the repairs of Roads, Bridges, Drains and Buildings for the present year ; and to state, that the Committee experienced great difficulty during last year in obtaining khoah of any kind at 10 Rs. per 10 [? 100] maunds, and that such as they did obtain was very inferior. They will not be able to obtain good khoah this year for less than 12 per 10 [? 100] maunds.

I beg to add, that although the Committee occasionally obtain the use of a Roller from the Town Conservancy establishment, they suffer inconvenience from the uncertainty of obtaining its loan, [I] beg again to repeat the wish of the Committee to be supplied with a powerful iron Roller for the use of the Intally district.

I have the honor to be,
Sir,
Your obedient servant,
(Signed) SAMUEL SMITH,
Chairman Intally Conservancy Committee.

No. 55. *a.*[1]

Plan for the management of Conservancy and Municipal affairs of the Punchanogram, or the whole or such portions of the Suburbs of Calcutta as to the Right Honorable the Governor of Bengal may seem proper.

Intally, 9th February, 1841.

1. That the Conservancy and all local matters (Police excepted) of Punchanogram (or as may be) be confided to the management of a general Board or Council to be denominated the Suburban Council or Board of Conservancy, and four (more or less as per margin) Division Committees.

2. That the Board of Council shall consist of the Magistrate as President, the Chairman of the Division Committees as Vice-Presidents, and the Members of Committees as

common Councillors, with power to levy an Assessment annually not exceeding 5 per cent upon the annual value of all houses or lands within its jurisdiction

3. That the Division Committees shall consist of five Members, to be elected by the inhabitants paying a monthly Rent of 20 Rupees (or occupying houses of an equal or superior value), one of whom shall be by them chosen as their Chairman

4. That to these Committees shall be entrusted the supervision of their own divisions, subject to the general control of the Board or Council.

5. That the Board shall have power to appoint a Collector of Assessment, a Superintendent of the Roads, a Head Clerk, and such minor establishments as it may seem necessary. The two first named appointments to be subject to the approval of the Right Honorable the Governor of Bengal, and to be notified in the Official Gazette.

6. That all Collections of Assessment be daily deposited in the Bank of Bengal or Union Bank of Calcutta as may be ordered, and all disbursements drawn therefrom by Cheques signed by the President or Vice-President (presiding) and countersigned by the Chief Clerk.

7. That the Meetings of the Board or Council shall be held at such centrical part of the Suburbs as may be decided on, and that the Division Committees do meet at some convenient place within their respective division, as may be agreed upon. The expense (if any) thereby incurred, and the salaries of such establishment as may be approved of by the Board, be defrayed out of the general funds *

8. That Annual Reports of the proceedings of the Board or Council be made to Government, and that the accounts be audited and published quarterly for the information of the inhabitants.

9 That the Civil Architect, the Superintendent of Canals, and the Deputy Collector of Punchanogram be ex-officio Members of the Suburban Board or Council.

N. B —To give effect to the above Plan, it will be necessary to vest in Suburban Landlords the same power of distraint for rent as is possessed by Landlords in Calcutta, and generally to put inhabitants of the Suburbs in the same position as the inhabitants of the Metropolis, otherwise they will petition against the proposed assessment.

If the limits of Calcutta should be extended, so as to include the Punchanogram, the above plan would require to be somewhat modified, and the Magistrate of the Suburbs, whether a civilian or person not in the East India Company's service, should not be the Magistrate of the 24-Pergunnahs, but might still be President of the Suburban Board or Council which might then undertake the Police duties also as in Calcutta

MEMO OF PROBABLE ESTABLISHMENT

Suburban Board or Council.

	Per mensem		
The Magistrate as President, (ex-officio)			
The Vice-President, (Honorary)			
Collector and Assessor of Assessments, a Commissioner,	400	0	0
Superintendent of Roads, ...	300	0	0
Head Clerk, ...	200	0	0
Minor Establishment, ...	100	0	0
Co's. Rs.	1,000	0	0

* Accommodation may be found, as at the Intally Division, free of charge. The Committee now meet at a house in the Gowkhana premises.

Division Committees.

Overseer Serjeant,	100	0	0
Clerk to Committee,	60	0	0
Six Peons, at 5	30	0	0
Six Sweepers, at 4,	24	0	0
Two Durwans, at 4,	8	0	0
Two Dooms, at 4,	8	0	0
Thirty Drivers, at 4,	120	0	0
Thirty Bullocks feed, at 4,	120	0	0
Stationery and petty expences (say)	30	0	0
Co's Rs.	500	0	0

N. B.—The numbers of Bullocks, Drivers, Sweepers, and Peons, must depend upon the extent of the division : the above being the maximum.

FINIS.

BISHOP'S COLLEGE PRESS :—CALCUTTA.

APPENDIX TO APPENDIX I.

TO

SECOND REPORT OF COMMITTEE

UPON

THE FEVER HOSPITAL

AND

MUNICIPAL IMPROVEMENTS:

CONTAINING

CORRESPONDENCE RESPECTING THE ADVANTAGES LIKELY TO RESULT BY MAKING A CANAL COMMUNICATION BETWEEN TOLLEY'S NULLAH AND CHANNEL CREEK, ETC.

CALCUTTA:

Bishop's College Press.

1848.

APPENDIX TO APPENDIX (I)

Index.

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APPENDIX TO APPENDIX (I)

No. I.

At a Meeting of the Special Committee, held at the house of the Hon'ble W. B. Bayley, Esq., 28th October, 1822. Sept. 30th. 1822.

Present, H. SHAKESPEAR, ESQ. *(President.)*
CAPTAIN H. MORRIESON, G. J. GORDON, G. BALLARD, ESQRS. *(Members.)*

The following Papers relative to a proposition for opening a Line of Canals between Calcutta and the Island of Saugor are now recorded.

No. I. *a.*

To H. SHAKESPEAR, ESQ.
CAPTAIN H. MORRIESON,
G. J. GORDON, AND G. BALLARD, ESQRS.
Committee for Reporting on Lieutenant Schalch's Plans.

Territorial Department, Revenue.

GENTLEMEN, No. 1

I am directed by the Most Noble the Governor General in Council to transmit to you the accompanying copy of a Letter from Mr. Henry Wood, proposing a Cut from Calcutta to Channel Creek, together with the Plans* and Estimate which accompanied it.

* 3 in No.

2. His Lordship in Council is quite disposed to agree in opinion with Mr. Wood, as to the utility of a Canal, such as is proposed, and considers it an object which Government should undertake in preference to leaving it to individual enterprize. Before, however, passing any final orders on the subject, His Lordship in Council is desirous of receiving from your Committee, a detailed Report of the sentiments entertained by you in regard to the general advantages of the work, with the suggestion of any improvements of which Mr. Wood's Plan may appear to be susceptible.

3. It is understood, that Lieutenant Schalch has carefully examined the tract through which it is for the most part proposed to lead the Canal in question, and has prepared plans for a similar work. You will naturally consult with that Officer, and with such other persons as may appear likely to afford useful information or suggestions. His Lordship in Council hopes that from the researches you have already made in regard to the Eastern

Sept. 30th 1822 Canal, proposed by Lieutenant Schalch, the present reference will not impose upon your Committee any heavy additional labor; but even were it much otherwise, His Lordship in Council feels assured that your public spirit would lead you freely to undertake the task.

I am,

Gentlemen.

Your most obedient servant

COUNCIL CHAMBER,
The 25th July, 1822.

(Signed) HOLT MACKENZIE,
Secretary to the Government

No. I. *a*.[1]

(Copy.)

HOLT MACKENZIE, ESQ.

Secretary to Government in the Territorial and Financial Department

SIR,

I have the honor to submit an Estimate of a Canal from Calcutta to Channel Creek, which I, through the medium of the Calcutta Gazette, brought to the notice of the Public in May 1816: and although my attention has since that period been often given to the subject, I have been prevented from taking any active measures to ensure its construction, from having been at times given to understand by some of the Members of Government that the Canal, instead of being constructed by a Society of private individuals, ought to be undertaken by the Government; and then again this opinion, after a considerable lapse of time, has been reversed, and I have been told that individuals should run all the risk and incur all the expense, without being insured the Profit arising from the Toll. The latter opinion was so very discouraging, that I no longer continued to give the work much consideration, although every year has only confirmed me in the opinion of its great usefulness.

2. I am now induced to bring it under the notice of Government, from having ascertained by soundings during the Neap Tides of the latter end of last May, that any ship may be hauled into Dog Creek, at the head of the New Anchorage, and be there either repaired or loaded, and unloaded if necessary, the soundings into the Creek being $3\frac{1}{2}$ fathoms, with 4 and 5 fathoms within; and Mr. James Kyd having since satisfied me that the soundings taken by myself, assisted by the Harbour Master, and one of the most experienced officers in the Company's service, were perfectly correct.

3. Dog Creek connects itself with Channel Creek through Bagwan Creek, and in the event of a Canal being constructed to Channel Creek, the smallest boat which navigates to Calcutta, may proceed down to the New Anchorage at any season of the year without risk or danger.

4. Before any body of capitalists could be induced to undertake a work attended with so heavy an outlay, it will naturally occur to the Government, that a guarantee must be given to ensure to the undertakers all the profits which may hereafter be realized from the use of the Canal when finished, and full permission to hold the lands required for the construction of the Canal, as well as such lands as may be required for storing Goods, Grain, &c. till a sale can be effected of them.

Sept. 30 1822.

5. In guaranteeing to a Society, subscribing capital to construct a Canal of the kind, all the profits which may eventually be realized, the Public may gain, but can never lose any thing, for the River will remain open, and it will always be optional with the Public to use the Canal or River, whichever may meet their convenience. I am therefore induced to hope, that his Excellency the Most Noble the Governor General in Council, may be pleased, by guaranteeing the profits to the subscribers, which may be raised from the Toll in perpetuity; and by granting permission to hold the land required for the Canal, do away the only obstacle which prevents my calling on the community to subscribe to the construction of a work, which I persuade myself will be more beneficial to the commercial interests of this Presidency, than has ever yet been undertaken.

6. The accompanying Survey [Surveys] of the country laying between Calcutta and Channel Creek, of Saugor Island and the New Anchorage, with the route of the Canal traced on them, will point out the direction of the proposed Canal; and its usefulness will be in proportion to the superior certainty and expedition which the Canal conveyance may offer over the River conveyance. It is probable that the Trade to India, with exception to a few ships belonging to the Hon'ble. the East India Company will be carried on by ships, whose Tonnage will admit of their loading off the Town of Calcutta. These ships in their progress down the River during the North [South?]-West monsoon, will be subject to considerable detention, and every year proves that many of them are obliged to put back from encountering bad weather at the head of the Bay. If the cause for returning originates in want of supplies, of whatever nature, she is obliged to wait till a River Sloop can be sent down, which takes from 10 to 15 days, and during this detention, she consumes the stock laid in with economy, to perform her destined voyage: and often at the expiration of the period, has the mortification to learn, that the Sloop from running aground, or other cause, has been prevented reaching her; and then has to wait the dispatch of a second.

7. If a ship puts back to repair any damage sustained from running aground or other cause, she is now obliged to proceed up to Town, or wait till people can be sent down in a River Sloop.

8. If the Canal be constructed, even supposing that there should be no establishments formed on the upper part of Saugor Island, the speedy communication at all seasons will be ensured, and one day will be sufficient to convey every requisite supply to the head of Dog Creek, after the receipt of a Letter in Calcutta; for any description of Boat will then be able to proceed down to the New Anchorage.

9. If establishments on the borders of Dog Creek are formed, and store houses are built, which it is more than probable will be the case, as the sand is now nearly cleared of the jungle, and a road constructed; a ship instead of proceeding up to Calcutta to receive a trifling repair, may be hauled into Dog Creek, unloaded if necessary, and repaired in the course of a few days; and then loaded again, without coming up to Town; or she may recruit her supplies and proceed to Sea without a day's detention.

10. Troops arriving on the Hon'ble Company's Ships, instead of being detained as at present, to their very great inconvenience, as well as considerable risk, will be able to proceed up to Town in common River Boats, via the Canal.

11. In addition to the usefulness of the Canal, as connected with the Import and Export Trade, it will offer a safe communication with the Sunderbunds to the Eastward, and afford an easy conveyance for the product of the cultivated country it runs through to the market of Calcutta; and will also ensure as speedy conveyance for any fish which may be taken in Channel Creek; and it will also tend to drain a tract of country, now under water during the greatest part of the year.

12. It may be necessary to lay before the Government, any particular calculation for the purpose of exhibiting the probable profits, likely to be realized by the Canal

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when finished These statements will be required when the guarantee of the Government is obtained to collect the Toll, and when it will be necessary to call on the Public to subscribe the capital required to finish the work. It may be sufficient here to state, that Tollie's Canal, and every other work of the kind that has been undertaken, has yielded an ample return for the capital expended; and that even the fish reared in any tank, will after the lapse of a few years, repay the expense of digging it.

I have, &c.

CALCUTTA, *(Signed,)* H. WOOD.
9th July 1822.

No. I. *a.*(1/2)

Estimate of a Canal from Calcutta to Channel Creek.

The distance from Calcutta to Channel Creek may be estimated at 47 miles, more or less, or yards 82,720, or cubits 165,440.

On the supposition that the Canal be in breadth 90 feet at the top, and 30 feet at the bottom, and in depth 21 feet, in yards it will be 30, 10, and 7; and in cubits 60, 20, and 14, then 40 × 14 × 165, 440=92,646,400, the solid contents of the Canal in cubits.

Suppose again, the Chowkah of 216 cubic cubits to cost Rupees 1/8, then $\frac{92,646,400}{216}$ × 1 Rupee and 8 Annas = 6,43,377 Rupees: which will be the cost of excavation.

To the above must be added two pairs of double and two pairs of single sluices, for retaining the water in the Canal, and for admitting boats to pass in and out at all periods of the tide; as well as for keeping out the tide waters, which by leaving a deposit, would be likely to choke the Canal. By the subjoined letter from a professional person, it will be seen, that the double sluices would cost 1,10,000 Rupees, to which if 40,000 Rupees, the probable amount of two pairs of single ones be added, the whole cost on this account will be 1,50,000 Rs.

The charge for superintendence may be estimated at 2,000 Rupees per mensem for three years, which will amount to 72,000 Rupees, and unestimated contingencies may be taken at 20,000 Rupees, making a total cost as follows:—

Cost of excavation of Earth	Rupees,	6,43,377
Sluices with their Masonry,		1,50,000
Contingencies,		20,000
Superintendence,		72,000
Purchase of Land,		56,910
	[9,42,287]	* 9,41,567

Sic in Original. J. M.

The cost of the ground is reckoned in the following manner:—supposing it to take in breadth 210 feet, and the whole length to be 47 miles, or feet 2,48,160; then it will be in square feet 5,21,13,600, which will give 3619 Beegahs of 14,400 square feet each. If the Beegah be estimated at 10 Rupees, which for the whole extent through which the Canal will run, may be considered a sufficient allowance, the land will come to 36,190 Rupees. If to this be added 20,000 Rupees as the surcharge of the land more immediately in the vicinity of Calcutta, then the whole cost will be 56,190 Rupees.

No. I. *a.* (1/2)

Sept 30th, 1822.

Sir,

Agreeable to your request, I have the pleasure to annex an Estimate of the probable expence of erecting four pairs of double gates, including masonry, wood, and iron work, allowing the width between the pier heads to be twenty-four feet in the clear, and at least eight feet of solid masonry below the sill of the gates; the side piers to be twelve feet thick in the centre, and continued that thickness to the joint of each gate, from thence diminishing towards the ends, to about three feet, and also in the perpendicular height from each gate to the end, to break in with the form of the bank of the Canal, as it would be of no utility to carry the masonry level.

The height from the upper part of the sill to the top of each gate, should be twenty-two feet, and the range of the sides, including the piers, one hundred and thirty feet; the masonry from the gates to its extremity, to form an easy curve, as described in your letter to me, which would prevent boats from receiving injury, should they come in contact with the sides.

I would recommend the gates to be made of Teak, being both light and durable: they would require to be coppered up to ten feet from the sill, which should also be coppered to defend them against the injuries they would otherwise receive from marine worms.

Each gate will require to be twenty-two feet high and sixteen feet broad, so as to form an angle sufficient to sustain the pressure, with a brass pivot to revolve in a brass saucer, in order to lessen the strain downwards, and make easy the opening and shutting them, and the upper hinges to be made of wrought iron, on the same principle as those of Dock Gates.

In this Estimate I have not calculated for piles, digging the foundation, or labour, other than for completing the masonry and gates. Therefore, the expence of digging out the place for the masonry and of piles, (should they be found necessary,) will form another estimate to be added to the amount of the present one.

An Estimate of the expence to erect four pair of double gates, as described in the prefixed letter.

Masonry for one set of double gates only, ... Sa. Rs.	23,000
Two pairs of Teak wood gates, coppered to ten feet above the sills, with a brass pivot to revolve in a brass saucer, ...	32,000
Masonry, and another set of gates as above, ...	55,000
Total Sicca Rupees,	1,10,000

(Signed) H. WOOD.

(A true Copy.)

Territorial Department.
The 25th July, 1822.

(Signed) HOLT MACKENZIE,
Secretary to Government.

No. I. *b.*

Sept. 30th. 1822

The following Letter was addressed

To LIEUT. SCHALCH.

&c. &c. &c.

Sir,

At the request of the Committee, I have the pleasure to forward to you copy of a Letter for Mr. Secretary Holt Mackenzie, dated the 25th ultimo, and its enclosures, being a Letter from Mr. H. Wood, submitting to Government a Plan and Estimate for opening a Canal from Calcutta to Channel Creek.

2. With reference to the 2nd Paragraph of Mr. Mackenzie's Letter, the Committee request you will be good enough to furnish them with all the information in your power, relative to the practicability and expediency of the plan suggested by Mr. Wood, and that you will likewise put them in possession of the details of the plan which you are under stood to have had in view for a similar work, noticing particularly in what respect you may consider your own plan preferable to that proposed by Mr. Wood.

I have the honor to be,
Sir.
Your obedient Servant.
(Signed.) H. SHAKESPEAR.
President of the Committee

Calcutta.
The 9th August, 1822.

No. I. *c.*

The following Letter received from Lieutenant Schalch with Memoir.

TO H SHAKESPEAR, ESQ.

&c. &c. &c.

No. 1. Sir,

In reply to your Letter of the 9th ultimo, I beg leave to state, that I have for some months past been engaged in forming a plan similar to that of Mr. Wood's. I have only now completed my enquiries on the various subjects connected with the practicability and utility of such a plan. These I have arranged under their appropriate heads in the accompanying Memoir, which I have now the honor of forwarding to you, to be laid before the Committee. As I have endeavoured to include every material point of information, which appeared to me to bear on the plan under consideration, I hope it will prove satisfactory to the Committee, and meet with the approbation of Government.

In reply to the 2nd Paragraph of your Letter, calling on me to state in what respects I may consider my own plan preferable to that proposed by Mr. Wood, I beg to observe,

that I conceive the two Plans to be similar in their principal features, and that if any preference may be attached to mine, it solely arises to my having obtained in my late pursuits a more intimate local knowledge of the country along the line of the proposed Canal, than that gentleman may be supposed to possess; occupied as his time and attention must unavoidably be, by the more important duties of his public situation. Sept 30th. 1822.

I have likewise the honor of forwarding an explanatory Map, also Mr. Wood's plans and papers.

I have, &c. &c.

CALCUTTA,
21st September, 1822.

(Signed) J. A. SCHALCH, LIEUT
Assist. Quarter Mast General

No. I. e.(1)

MEMOIR.

On the formation of a Canal between Calcutta and Channel Creek, with branches to the River Hoogly at Diamond Harbour and Rangafulla; with a few remarks on the probable advantages resulting from the adoption of such a measure: being a Supplement to a former Plan for improving the Inland Navigation of Bengal.

In this Plan, which is now before Government, my inquiries and attention were wholly directed to the means of facilitating the communication by water between Calcutta and the Provinces lying to the Northward and Eastward. On the publication of that plan, however, it was suggested to me by some of the principal merchants of Calcutta, interested in the subject, to extend its limits, by including the state of the Navigation of the Hooghly, between Calcutta and the Sea, and the best means of remedying the inconveniences of such a passage.

It was generally believed, that many important advantages might be derived from, and many of the inconveniences at present complained of be removed, by the formation of a Canal of communication between Calcutta, and certain parts of the River below the junction of the Roopnarain. It was therefore proposed to me to examine the utility and feasibility of such a measure, and in the event of these being established, to draw up a Plan and Estimate of the probable expense of its execution, in order that the subject might be laid publicly before the Mercantile body of Calcutta, to obtain by subscription the sum necessary for the undertaking.

I had no hesitation in taking the task in hand, as I had already obtained the greatest part of the requisite information, which chiefly consists in the relative state of the tides at Calcutta and the lower parts of the River, and of the level of the country with regard to them.

I therefore made out, in the first instance, a Plan for a Canal to Diamond Harbour, with an Estimate of the expense, which was privately circulated among the principal Merchants in Calcutta. The utility of the Canal, and the prospect it held out of a profitable return, were universally admitted; but, the general opinion was against its being undertaken by a body of private individuals, on the grounds of the inability of Government to grant a charter of corporation, without which, future inconvenience and annoyance were to be apprehended. It was also urged, that, in a country where Government had an exclu-

Sept. 30th, 1822

sive interest in the land, works of this nature ought more clearly to be undertaken by them; as they would eventually be the chief gainers. The object of the Merchants not being to derive pecuniary advantage from a Canal speculation, but to obtain a safe and expeditious communication between shipping in various parts of the River and Calcutta.

Firmly assured of the attention of Government to the suggestion of any plan of improvement, conducive to the interests of the public, involving no very considerable expenditure, and at the same time affording the prospect of an ample pecuniary return, I beg leave to offer to their consideration the following observations, which, for the sake of perspicuity, I shall discuss in the following order :—

1st. The inconvenience and delay of the present communication by water, between Calcutta and the lower parts of the Hooghly River.

2nd. The direction and extent of certain Canals, from the construction of which, it is expected that intercourse may be benefitted.

3rd. A detailed account of the different levels of the country through which it is proposed to carry the Canals, with the relative heights of the Tide at Rangafulla, Diamond Harbour, and Calcutta.

4th. The description of Canal, which it is proposed to adopt.

5th. The advantages that such a Canal may be presumed to possess over those of a different kind.

6th. An estimate of the probable expense ; and,

7th. The profit and advantages that may reasonably be expected from their formation.

First. The numerous sands which stretch in many places entirely across the bed of the Hooghly, between Calcutta and the Sea, render the Channel at those places so shallow that it becomes dangerous for vessels to attempt a passage over them, at even the highest state of the Tide, consequently small vessels only can take in a full cargo at Calcutta, while others of greater draught, are compelled to complete their freight at Diamond Harbour, Rangafulla, Kedgeree, the New Anchorage, and other places down the River.

The chief obstructions to the Navigation of the Hooghly, are the sands near Moyapoor and Fultah, the James and Mary, and the Rangafulla shoals. Even vessels, of comparatively small draught, experience great delay in their progress up and down the River ; as these sands can be crossed only during the height of a spring tide.

During the prevalence of the South-west Monsoon, vessels await in the vicinity of some of these sands the opportunity of a high Tide to effect their passage across.

Under such circumstances, it not unfrequently occurs, that, before the current has obtained a degree of velocity sufficiently powerful to propel a vessel against the wind the water has so far subsided, as to render, at that time, all further progress impracticable. Vessels of large dimensions are in this manner often detained, until the return of the succeeding spring tides.

On this account, a constant intercourse is necessarily maintained between Calcutta and the lower parts of the River, particularly those above mentioned. The facility, economy, and safety of this communication, becomes therefore a subject of no inconsiderable degree of interest.

The great breadth of the River at, and below Diamond Harbour, and the heavy swell which there rolls in from the Sea, during the prevalence of the South-west Monsoon, render the Navigation in those parts, more peculiarly at that season, extremely dangerous, and sometimes for small craft impracticable. Hence, frequent accidents occur in the passage to and from the shipping in the lower parts of the River. The danger of the passage also increases the price of hire. It may not perhaps be thought out of place here to mention, that the mere hire of a passage boat, between Calcutta and the New Anchorage, during the South-west Monsoon, amounts to no less than one-fifth of that to Europe.

The laudable exertions of the Saugor Island Society, which if successful, must eventually prove highly beneficial to Government, are much impeded from the want of a safe and expeditious communication with Calcutta. Indeed, all intercourse may at present be said to be stopped during the stormy months of the year, not only with Calcutta, but with the adjacent cultivated country. The price of every article of consumption is, therefore, at that time, much enhanced. The cultivation of the Island being the principal object of the Society, it is evident, this can be attained, only by the introduction of labourers, which again will be proportional to the inducement held out for settling. Sept. 8th 1822.

The means at present adopted for the conveyance of Freight, Stores, &c. between Calcutta and the lower parts of the Hooghly, are the River Sloops ; a species of craft, which seems to have been ingeniously contrived to combine every disadvantage and inconvenience to which the carriage of goods is exposed. The delay and uncertainty of their motions ; the great risk of damage to their cargoes, from the water penetrating their leaky decks and sides ; their liability to run aground, from the deficiency of their appointments, and the ignorance of their commanders, all tend to confirm this position, and to shew, how ill adapted they are to the purpose in which they are employed. To quote particular instances is unnecessary. They are too well known, and of too frequent recurrence, to require enumeration.

The expense of this mode of conveyance will be considered in another place.

2nd. A reference to the Map will shew, that Tolly's Nullah, from its junction with the River at Kidderpore, to Coodgutta, deviates but little from a straight line. At Coodgutta, however, the stream takes a considerable bend to the Eastward, but at this spot it is joined by a Nullah called the Puttooree, which flows from a Jeel to the Southward. The latter Nullah has a Southerly direction to the Village of Kamrapokeria, a distance of nearly two miles. It is 70 feet broad, and 3 feet deep at low water, at its union with Tolly's Nullah, but gradually diminishes in breadth and depth from thence to Kamrapokeria, where at low water it is 60 feet broad, and one foot deep.

This Nullah is at present only resorted to by a few country boats, as a harbour where they may refit, and by some canoes carrying grain from the adjacent country to Chittleehaut.

As Tolly's Nullah from the Hooghly to Coodgutta, and the Puttooree from Coodgutta to Kamrapokeria are so favorably situated, the expense would be considerably diminished by converting these portions of the two Nullahs into a part of the proposed communication. In the first place, it would obviate the necessity of excavating an extent of 5 miles, through ground greatly elevated above the adjacent country. Secondly, that of constructing numerous Bridges and Drains, otherwise indispensible ; and lastly, by the adoption of such a measure, the purchase of Land, at an exorbitantly high price, would be avoided.

On calculation it appears that the expense thus spared, would alone equal that incurred in the formation of the remainder of the Canal.

By following the line I propose, we arrive at the low swampy country at the back of the Suburbs, without the purchase of Land, or the erection of buildings of any description.

From Kamrapokeria the Canal should be carried in a straight line to the village of Oostee, which is situated on a branch of the Nullah flowing into the Hooghly close to the Harbour Master's house at Diamond Harbour. This Nullah should be made a convenient channel of communication with the River, by cutting off its present bends, and deepening and widening the bed to the extent required.

From Oostee to Hotogong, in nearly a direct line, there are a number of small Nullahs, with a considerable depth of water. These might be rendered navigable at a trifling expense.

From Hotogong, the Canal should be carried at the distance of at least a mile from the

Sept. 30th. 1822 present bank of the River, to the head of the inlet from Channel Creek. At this place it is suggested to open a communication direct with the Hooghly. The inlet has breadth and depth sufficient for the largest sized boat.

From the head of the inlet, the route to the New Anchorage follows the direction of the red dotted line, down Channel Creek to the entrance of Bugwa Kally, and continues through this to Dog Creek; off which is the New Anchorage. Channel Creek is seldom much agitated, being sheltered in, in a great measure by Saugor Island. In the Bugwa Kally, at the entrance of which is the settlement of Shikarpoor and Mary's Bay, there is a depth of from one to two fathoms at low water, and an average breadth of 200 feet. Dog Creek has a greater depth of water, with nearly the same breadth.

Such is the direction which, after a careful Survey of the country, appears to me to be best suited for the proposed Canal. To carry the Canal by the side of the Diamond Harbour Road, would increase the distance nearly two miles, without acquiring any adequate compensation. By Fig. 3rd it appears, that the excavation along the side of the Road is too insignificant to be taken into consideration. It also appears from the same figure, which is a true section of the road, ditch, and adjacent country, that the road would be liable to be borne down by the great body of water against it. The road itself is an object of no consideration, as the earth excavated from the Canal would be sufficient to form a road along its banks.

3rd. As the success of the Plan will so greatly depend on a correct knowledge of the Level of the country in the direction of the Canal, and the relative state of the tides in Tolly's Nullah, and in the Hooghly, at Diamond Harbour, and Rangafulla, I shall enter more minutely into this subject, shewing at the same time, in what manner I obtained my information on these important points.

Fig. 1st. Is the Section I made of the country between Kamrapokeria and Jagheerghaut on the Diamond Harbour Road, along the line A. B. on the Map; from this Section it will be seen, that the surface of the water in the Ditch by the side of the road, is 3 feet lower than the High Water mark during the Spring tides in the Puttooree Nullah, and one foot lower than the general level of the country.

From Jagheerghaut to Diamond Harbour, the surface of the water in the Ditch continued uniformly on the same level. By levels taken from the Ditch, to the Nullah near the Harbour Master's house, it appeared that the surface of the water in the Ditch was about three feet below the level of the Spring tide High Water mark in March, and the surface of the country was generally one foot below the same level; consequently at Diamond Harbour the ground is about a foot higher than at Tolly's Nullah.

This fact is further established by the reports of the villagers between Calcutta and Culpee, who affirm that during the rains, the water drains northward into Tolly's Nullah.

Having thus ascertained the Level of the ground, I proceeded in the following manner to examine the relative state of the Tides at Tolly's Nullah and Diamond Harbour. At Diamond Harbour, in March, the Spring-tides rose as before mentioned, three feet above the level of the water in the Ditch. In Tolly's Nullah, at Coodgutta, the Spring-tides rose to the same height; the level of High-water Spring-tides, in the Dry Season, is therefore the same at both places.

A reference to Fig. 4th will place what I have farther to say on this subject, in a clearer light. It appears from this, that at Diamond Harbour the ebb falls 18½ feet, whereas at Coodgutta, in Tolly's Nullah, it never falls lower than 7½ or 8 feet. The difference between the Height of a Spring and Neap tide is, at the former place, 8 feet; whereas, it is only 3 feet at the latter; during the height of the periodical rains, the rise of the tide is augmented 2 feet at Diamond Harbour, but only one at Coodgutta. The total rise and fall of the Tide is, therefore, 20½ feet at Diamond Harbour, whilst at Coodgutta it seldom exceeds 9 feet.

The circumstances of the Tide are so nearly equal at Diamond Harbour and Rangafulla; that what I have said of the former place, will equally apply to the latter. Sept. 30th. 1822.

4th. Upon a careful consideration of the above Levels, it appears to me, that the description of Canal which promises most fully to combine the three important and requisite objects of facility of passage; safety to the adjacent country; and economy; is one of such a depth, that its surface, at low water, may be on the same level with that of a neap-tide in the lower parts of the River; the water being retained in the Canal by means of Sluice gates, opening inwards, at each communication with the River Hooghly.

Fig. 11th. Is the section of such a Canal, 6 feet deep at low water, 50 feet broad at bottom, and 90 feet broad at top. From an inspection of Fig. 4th, it will be seen, that the high water mark of the neap-tides at Diamond Harbour is nearly on a level with low water in Tolly's Nullah: consequently, there will at all times be a sufficient supply of water in the Canal.

The Sluice gates to form the communication with the River Hooghly, should be placed at Oostee and at Rangafulla.

It is evident that during the neap-tides, the tide will flow in and out of the Canal through Tolly's Nullah, and that boats can only pass through the sluices at High Water. As the tides increase, however, from the Neaps to the Springs, so will the tide from the River Hooghly overpower that from Tolly's Nullah. The tides will then set up the Canal, or in an opposite direction to that they flowed in during the neaps. The time in which boats can pass through the sluices, will also be increased. The depth of water in the Canal will also be augmented from 6 to 15 feet.

Fig. 5th. Is a section of a Sluice gate. The width of the passage of the sluice is 24 feet, which it is presumed, will be found sufficiently capacious for the convenient passage of any boat that may navigate the Canal.

The height of the gate is eight feet, consequently a depth of water to this extent may be retained in the Canal. The depth can, however, be regulated hereafter by the description of boat that may be found best suited to the navigation. The gate is more particularly adapted to a depth of from four to six feet.

It is proposed to open and shut the Sluice gates by means of chains attached to the bottom of the gates, which are to be worked by winches.

It is evident, that with only one passage of the above dimensions, boats would experience great inconvenience and delay in passing through. I would therefore propose that two be constructed at each place of communication; viz. at Oostee and Rangafulla. At the latter place, which is the termination of the Canal, the Sluice gates will also open into the Nullah which leads to Channel Creek.

At Oostee and Rangafulla, a basin should be formed, sufficiently capacious to hold the craft that may be expected to be there, awaiting the opening of the gates.

Besides the inconvenience that would be experienced in passing and repassing through so confined a breadth as 24 feet, it must be obvious that, as the section of the Lock is so disproportionally small to that of the Canal, being only one half, the Tide during the Springs, would rush through it with a violence that would render the passage either extremely hazardous or impassable.

For this reason alone I would propose the construction of two Sluices, one of which should be appropriated to boats passing into the Canal, and the other to those going out Two of 24 feet each, will give a section nearly equal to that of the Canal, in which case the velocity of the stream throught he locks will be the same as in the other parts of the Channel.

5th. I have now exhibited the principal features of the Plan, from the adoption of which, it appears to me the desired object will be attained in the most economical manner. But, as the Plan will, probably, meet with many objections from the advocates in

Sept. 30th. 1822. favor, either of a Canal entirely open, or one closed by locks at both extremities, I shall briefly state what I conceive to be the disadvantages of both these Plans.

First, for the open Canal from Fig. 4th, it will be seen, that the general level of the country is about one foot lower than the High Water mark of a Spring tide in March, and that the rise and fall of the Tide in the spring is $18\frac{1}{2}$ feet. In order, therefore, to obtain a depth of 6 feet at low water, it would be necessary to excavate a depth of $24\frac{1}{2}$ feet. The dotted traperoid A. B. C. D. in Fig. 3, shews the section of an open Canal, with the same surface at low water as the one I propose. The two sections are in the ratio of about two and a half to one, consequently the expense of the two will bear nearly the same proportion.

The quantity of land required for the Canal, would also be increased one-third.

Against the formation of an open Canal, joining by so short a course two distant points in the same River, an objection may be urged, that the velocity through the Canal would be so great as to endanger the adjacent country, either from the enlargement of its bed, or from the current leaving its original Channel, and assuming a winding course. It has even been surmised, that the River, finding a shorter course through the Canal, would there force a passage, and eventually abandon its present bed. I do not, however, apprehend any great danger from this cause, for it can be demonstrated, that from the greater friction to which the water is subjected in the smaller Channel of the Canal, its velocity will be less than than that of the River nearly in the ratio of 6 to 7.

As the expense of a Canal entirely open would be greater than that of the one I propose, for the same reason the expense of excavating a Canal with locks at both ends, to maintain the surface of the water at a high level, would be less. I have before shewn, that in forming a Canal partially open, it will be necessary to excavate a depth of 13 feet, whereas were Lock-gates employed, as I have above mentioned, 8 feet only need be excavated. The expense therefore of digging a Canal of this description would be about one-half of that required for the other. If the cost of the Lock-gates, however, be included, the total expense would not, perhaps, be found to fall short of that of the Canal I propose.

The disadvantage of such a Canal principally consists in the great size of the Lock-gates. At Diamond Harbour and Rangafulla, where the tide flows and ebbs 21 feet, it would be necessary to make the gates 27 feet high; and to render the Canal navigable by boats of equal size to those that can be employed on the other, the breadth of the gate should be 24 feet. Gates of this dimension would, from their size and weight, be extremely unmanageable, and subject to frequent injury; to repair which would involve not only a heavy expenditure, but a loss of toll during the time that the repairs were prosecuting.

The disadvantage of Lock-gates may appear, on a hasty consideration of the subject, to apply equally to the Plan which I propose. The difference, however, is considerable. What I propose are mere Sluice gates, opening and closing with the tide, and are formed for the sole purpose of retaining the water in the Canal, when its surface falls to a certain level. They also require little, or no attendance, since with the aid of the current, two men will be found sufficient to open and shut them. As each passage is supplied with two gates, no stoppage to the Navigation of the Canal will occur, should it be found necessary to remove either of them to be repaired. The expense, of gates of this description, will not amount to one-third of that of regular Lock-gates.

The communication being cut off with the River at Diamond Harbour and Rangafulla during the neap-tides, except at High Water, will perhaps be considered an objection to the Plan I propose. It must be remembered, however, that this will only occur at the period of very low neap tides. At other times, boats will be enabled to pass in and out of the Canal during three to six hours of the tides.

I shall now endeavour to prove, that the velocity of the current in the Canal, owing to

its confined Channel, will be so considerably less than that of the Hooghly, that no apprehension from this cause can reasonably be entertained.

In the Plan which is now before Government, for the formation of a safe and permanent communication between Calcutta and the Upper and Eastern Provinces of Bengal, I have shewn that the theory of running water has, of late years, been brought to coincide so remarkably with facts, that we are enabled to calculate to a degree of accuracy, sufficient for practical purposes, the velocity that any Canal may be expected to have, whose slope and dimensions are determined.

We will suppose in the present case, that on the falling of the Tide, the *mean* velocity of the Hooghly in the rains, between Calcutta and Diamond Harbour, to be five miles an hour, and its *mean* depth, at High-water, to be fifty feet. By Eytelwein's formula, we have $\surd = 0{\cdot}91 \surd f.\ d.$ $\surd$ being the velocity in inches per second, $f.$ the fall of the *surface*, in inches, in two miles, and $d.$ the Hydraulic mean depth; or the area of the section divided by the perimeter of the part in contact with the water. Hence we obtain $f = \frac{\surd^2}{83d}$, equal, in our present example, to $\frac{7744}{498} = 15{\cdot}5$ inches, the fall in two miles, or $7\frac{3}{4}$ inches per mile. This agrees nearly with the fall deduced from the levels taken between the two places.

The distance between Calcutta and Diamond Harbour is, by the River, 47 miles, but by the Canal, it will be only 29; the fall, therefore, in the Canal, will be, to that in the River, inversely as these numbers, or equal to $12\frac{1}{2}$ inches in the mile. At High-water in the Canal, $d. = \frac{862}{96} = 9$ feet, or 108 inches. Then $\surd{\cdot}91 \surd 25 \times 108 = 47{\cdot}3$ inches per second, or 2·6 miles per hour.

It appears from this, that the velocity in the Canal cannot, at the utmost, exceed 3 miles an hour, from which no danger need be apprehended, either to the sides or bottom of the Channel. Supposing that the quantities assumed for the Fall and Depth of the River are not strictly accurate, we still obtain the relative velocities of the River and Canal; viz. that the utmost velocity of the Canal will be about half that of the River.

I shall conclude this part of the subject by observing, that the sluices will effectually preserve the bed of the Channel from enlarging; as this operation commences from the lower extremity of the stream. Hence there can be no solid ground for supposing that the Hooghly would desert its present Channel and flow through that of the Canal; or that the Town of Calcutta, and the country adjacent to the Canal, would be at all exposed to injury from the proposed undertaking.

6th. The expense of the Canal, Sluices, and Harbours, will be nearly as follows:—

Excavating a Canal 13 feet deep, 90 feet broad, at top, and 50 feet at bottom, From Tolly's Nullah at Coodgutta to Oostee, a distance of $17\frac{1}{4}$ miles at $1\frac{1}{2}$ Rs. the cube of 729 feet,... .. .. Sa. Rs.	1,70,534
Excavating from Oostee to the Navigable part of the Inlet from Channel Creek, a distance of 20 miles at the same rate, ...	1,97,720
Dredging the passage from Oostee to Diamond Harbour, and deepening the mouth of the Nullah at Diamond Harbour, sufficiently to admit ships to receive or deliver freight,...	20,000
Dredging a Harbour for the same purpose at the mouth of Dog Creek, or the the New Anchorage,...	10,000
Cost of 2,732 Beegahs of Land, (50 feet extra being purchased on each side of the Canal,) at 10 Rupees a Beegah,...	27,320
Carried over, ... Sa. Rs.	4,25,574

Sept. 30th. 1822.

Brought over, ...		Sa. Rs.	4,25,574
Masonry for one Sluice, with wood and frame work as follows :—			
41,600 cubic feet of masonry at 16 Rs. per 100 cubic feet, ...	6,656		
Two Gates, ...	2,000		
Total for one Sluice, ...	8,656		
For four Sluices, ...			34,624
			4,60,198
Contingencies at 10 per cent.			46,099
		Total, Sicca Rs	*5,06,217

Qy 5,0,6,297 J. M.

In this Estimate I have made no deduction for the existing excavations along the line, as those between Oostee and Hotogong, and the Puttooree Nullah, from Tolly's Nullah to Kamrapokeria. There is every reason therefore to expect the sum specified will be more than sufficient to meet every accidental expense of the undertaking.

I have now, I believe, enumerated every material circumstance connected with the Plan under consideration. A more minute examination of the country may perhaps suggest some partial alteration. As I have, however, surveyed the whole of the tract through which it is proposed to carry the Canal, I entertain no apprehension of any unforeseen event, that may in any wise affect the success of the scheme. A Plan, on a more economical scale, could no doubt be formed; for instance, the dimensions might be reduced either in breadth or in depth; but in doing this, the convenience of the Navigation would proportionally diminish. The dimensions I have adopted are such as will allow country boats of any description to pass freely in every part of the Canal, at the lowest state of the tide. To have proposed a Canal merely for the Navigation of a particular kind of small boat, which is the method generally followed in Europe, when similar works are projected, would have only deceived Government by an apparent display of economy. As the passage down Channel Creek to the mouth of the Bugwakally could not be navigated with safety during the South-west Monsoon by boats of the above description, it would be necessary to shift the Cargo at Rangafulla. It need scarcely be remarked, that the delay, risk, and expense of such an operation, would not be compensated by the advantage of the Canal.

7th. In stating the inconvenience of the present Navigation of the River by small craft, the benefits likely to be derived from the proposed undertaking, the object of which is to obviate these disadvantages, must naturally, at the same time, have been suggested. It only remains therefore, to point out a few unconnected with what has already been said.

It appears from the Regulations of the Master Attendant's Office, that Pilots are forbid to take ships from Calcutta with a greater draught of water than 17 feet: from Diamond Harbour, however, they can take out a ship drawing 19 feet water. The difference between a draught of 17 and 19 feet, however, in a 600 ton ship amounts to one-fourth of her whole Cargo. As the River is therefore frequented by a number of ships of the above class, a considerable quantity of Cargo must necessarily be taken in, and delivered, at and below Diamond Harbour.

In proof of the above assertion, with reference to Diamond Harbour, I witnessed the day on which I was observing the levels at Diamond Harbour, no less than 6 ships receiving or delivering Cargo. They were the following :—

The Hashmee, 495 tons, taking a Cargo from Town.

The Lady Nugent, 492 tons, anchored in order to deliver part of her Cargo, but was countermanded to Bombay without unloading.

The Nerbudda, 592 tons, unloading in order to proceed up to Town.

Lady Flora, 705 tons, &c. &c.

St. Thiago, Macowan, 1,000 tons, waiting for her Cargo.

These are only a few instances in point, which casually presented themselves to my limited observation. Sept. 30th. 1822.

In further illustration of the utility of a Canal between Calcutta and Diamond Harbour, it may be mentioned, that although Vessels can sail from that place with a draught of only 19 feet, yet with a flowing tide, they come up to it drawing frequently 21, and occasionally 22 feet. This was the case with the Lady Flora already mentioned.

The number of ships that at present annually resort to the New Anchorage for the purpose of receiving or delivering Cargo, may be taken at 27; viz. 7 Ships belonging to the Hon'ble East India Company, and 20 the property of Private Individuals. The former Vessels, of which the measured Tonnage may be averaged at 1,000 tons each, take in and deliver their whole Cargo. The latter Vessels only receive or deliver a fourth. These may be taken at 700 tons each.

The actual Tonnage of a Vessel generally amounts to one-third more than the measured.

From the above statement it appears, that about 41,000 tons* would yearly pass through the Canal; supposing that the same number and description of Ships as at present, resort to Diamond Harbour and the New Anchorage.

* 13,000 Tons between Calcutta and Diamond Harbour, and 28,000 Tons between Calcutta and the New Anchorage.

The established rate of conveying freight between Calcutta and Diamond Harbour by the River is about 1 Rupee 10 Annas a Ton, during the South-west Monsoon, and 13 Annas a Ton during the rest of the year; or on an average, 1 Rupee 4 Annas per Ton throughout the year. Between Calcutta and the New Anchorage, the rates are doubled.

It appears on calculation, that the freight of Goods by the Canal might be reduced to 1 Rupee for every Ton to Diamond Harbour, and 2 Rupees per Ton to the New Anchorage; a Toll therefore, averaging 6 Annas a Ton, might be laid on goods passing through the Canal. For as the expense would be equal, the superior advantages of the Canal Navigation, in quickness of passage and safety, would at all times insure its preference over that of the River.

The Cargo at present taken in and delivered at Diamond Harbour and the New Anchorage, I have before shewn to be about 41,000 Tons, which at 6 Annas per Ton, would give an Annual return of 15,375 Rupees, which together with the Tolls on passage boats and boats carrying the produce of the adjacent country, would probably amount to 20,000 Rupees, or 4 per cent. per annum on the original outlay.

It is evident that at the present interest of money, the above return would not warrant the adoption of the Plan, considered merely with reference to future pecuniary advantage. It may, however, be confidently expected, that on the formation of the Harbours contemplated, and the communicating Canal with Calcutta, the quantity of Cargo taken in and delivered will be much increased, perhaps doubled. In which case, the adoption of the scheme would prove not only beneficial in the highest degree to the commercial interests of the country, but also a source of no inconsiderable pecuniary advantage to Government.

It is I believe generally admitted by Mercantile men, that if a Canal were carried from Calcutta to the New Anchorage, and a secure Dock constructed at Dog Creek, in which vessels might lie for the various purposes of taking in and delivering Cargo, repairing and waiting the receipt of supplies from Town, it would be generally resorted to, and prove of incalculable advantage to the Shipping in general.

A Dock of this description, as I have before remarked, might be made both at Diamond Harbour and the New Anchorage, at the inconsiderable expense of 10,000 Rupees each, by merely dredging a channel at the mouths of the two Creeks, and by laying Buoys in convenient positions for warping vessels in and out.

The erection of Dock Yards, Store Houses, Villages, and Bazars, immediately in the

Sept. 30th, 1822. vicinity of the Dock, at Dog Creek, will be a certain consequence of its formation. The cultivation of the surrounding country will naturally follow, bringing with it an increased salubrity of climate, and thus may be obtained in an indirect, though obvious manner, the removal of the Jungle, and the population of Saugor Island; an object which has occupied successively the attention of Government, of Native Speculators, and of an European Society. The efforts of the two first have proved abortive. I feel a degree of confidence in predicting, that if those of the present Society are crowned with success, it will chiefly, if not wholly, arise out of an undertaking similar to the one now proposed.

I have now I believe touched upon every point that can bear any reference to the subject under consideration. In the prosecution of my inquiries, no personal inconvenience has been considered, no exertions spared, no expense withheld.

The result I now offer to Government, under the flattering hope, that my researches will not be wholly unprofitable, nor my labours unattended with ultimate benefit.

Prospects at a distance the most alluring, do not always, it is true, on a nearer approach, realize expectation; nor are the wisest and best laid Schemes invariably attended with the desired termination; but surely ultimate success may, not presumptuously, be argued from the execution of a Plan, in itself so practicable, and which affords the fairest and most reasonable hopes of future advantage.

CALCUTTA,
September 16*th*, 1822.

(Signed,) J. AUG. SCHALCH,
Deputy Assistant Quarter Master General.

The following Draft Letter was submitted to the Members of the Committee.

No. I. *d.*

To HOLT MACKENZIE, ESQ.
Secretary to Government in the Territorial Department.

SIR,

We have the honor to acknowledge the receipt of your Letter of the 25th July last, with the Documents which accompanied it, relative to a proposed Cut from Calcutta to Channel Creek.

We lost no time in furnishing Lieutenant Schalch with copies of the Documents in question, and we requested him to put us in possession of the details of the Plan projected by him for a similar undertaking, and to point out to us in what respects his own Plan might be considered preferable to that suggested by Mr. Wood.

Having now received from Lieutenant Schalch the information required, we beg to submit the undermentioned Documents, for the consideration of his Excellency the Most Noble the Governor General in Council; viz.

1st. Letter from Lieutenant Schalch, dated the 21st instant.

2nd. A detailed Memoir on the formation of a Canal between Calcutta and Channel Creek, with branches to the River Hooghly at Diamond Harbour and Rangafulla.

3rd. A Plan shewing the course of the River Hooghly, and the line of the proposed Canal, with Sections and Levels of the country through which it is proposed to carry it; explanations of the Rise and Fall of the Tides, sketches of the Sluice Gates, and other delineations calculated to explain the Memoir. Sept. 30th, 1822.

Having been apprized that it is the wish of Government to be furnished with these Documents, and with our opinions on the practicability and expediency of the proposed Plan without delay, and adverting also to the near approach of the season of the year, at which, if the work be approved, it should be commenced upon, we have refrained from entering into the same minute course of enquiry as that which we have been prosecuting in regard to Lieutenant Schalch's former Plan for improving the Inland Navigation of Bengal, from Coolna in the Sunderbuns to the River Hooghly near Calcutta.

The execution of the proposed Cut to Channel Creek involves few points requiring minute or scientific examination.

The Levels of the country, the comparative Height of the Tides, and the other details of local information furnished by Lieutenant Schalch, are the result of repeated visits and careful enquiries personally conducted by him, and our past experience warrants the fullest reliance on his accuracy in these particulars.

Some of the Members of the Committee have themselves had opportunities of judging of the nature of the country, and of the practicability of the Scheme as far as Diamond Harbour; we have the further advantage of Mr. H. Wood's information and judgment, and we know that Mr. Betts, formerly Superintendent of Embankments in the 24-Purgunnahs, who at the request of the late Mr. Eliot surveyed and took Levels of the country from Calcutta to Channel Creek, was decidedly of opinion, that such a Canal could be formed without encountering any serious obstacle.

With this information before us, and with the general conviction in its favor of other European gentlemen who have considered the subject, we entertain no doubts of the easy accomplishment of the work in the manner now proposed by Lieutenant Schalch.

The following are the principal points of difference requiring to be noticed between the Plans suggested by Mr. Wood and by Lieutenant Schalch: Mr. Wood proposes to connect his Canal with the River Hooghly at a point nearly opposite to the Botanical Gardens, and to carry it thence in a straight line to the neighbourhood of Hanspokeria, where it would cross the Diamond Harbour Road.

Lieutenant Schalch apprehends some danger from a direct connection between the River Hooghly and the Canal at that point; the price of the ground is also comparatively high in that neighbourhood, and the Plan would involve a heavy expense, both on that account and for the construction of Lock gates and of Bridges at the spots where the Canal would cross the Garden Reach, Budge Budge, and Diamond Harbour Road.

Lieutenant Schalch to avoid these inconveniences, proposes to avail himself of the existing line by Tolly's Canal as far as Russapugla, and of a natural Nullah which falls into Tolly's Canal near that place, and runs some distance into the interior of the country. The advantages of this line over that suggested by Mr. Wood are more fully explained under the second head of Lieutenant Schalch's Memoir.

There is no material variation in the lines of the two Canals during the remainder of the route. Lieutenant Schalch's line, however, is carried considerably more to the Westward than Mr. Wood's, and thus admits of advantage being taken of some natural Nullahs lying in the course, which will facilitate the work and diminish the expense. Mr. Wood's Plan would doubtless have included those facilities, had he been apprized of their existence.

Lieutenant Schalch's scheme also provides for the junction of two branches with the main Canal, one uniting with the Hooghly at Diamond Harbour, and the other at Ranga-

Sept. 30th, 1822. fulla, which are not included in Mr. Wood's proposition. The advantage of these lateral Cuts is sufficiently obvious.

The expense of the whole work, as calculated by Mr. Wood, is 9,41,567 Rupees, and as calculated by Lieutenant Schalch, is 5,06,217.

We see no reason to doubt the general accuracy of Lieutenant Schalch's Estimates, allowance being made for the facilities which the work will derive from existing Nullahs, and for the fact, that the Canal will for a considerable distance pass through a low swampy tract of ground, which is at present of inconsiderable value.

The public advantages anticipated from the completion of the work are noticed generally, both by Mr. Wood and Lieutenant Schalch, and we concur with those gentlemen in opinion, that most of them would be realized to the extent contemplated.

From the enquiries which we have made, the sum assumed by Lieutenant Schalch, as the amount of the Tolls likely to be realized from the Canal, is as large as can safely be calculated upon for some time after the Canal is opened. We had imagined that a diminution in the existing rate of Insurance, consequent upon the safer and more expeditious conveyance of Goods by the Canal, than by the River, would have admitted of a larger toll than that specified by Lieutenant Schalch, being levied on Cargoes transmitted by the Canal to and from Ships at the New Anchorage, Rangafulla, and Diamond Harbour, and on supplies forwarded from Calcutta to the shipping at those places.

The River risk, however, is included in the general insurance of the voyage, and the Insurance Offices at this place would not, we understand, be prepared to make any reduction on their rates in consequence of the diminished risk of conveyance by the Canal.

We are inclined to attach more importance than Lieutenant Schalch has done to the safe communication which the Canal will offer to the Commerce passing through the Lower Sunderbunds, and to the facilities afforded by the Canal for the conveyance to Calcutta of the produce of the country in its vicinity, and we think the Tolls on that account might be estimated at a higher amount than is assumed in the Memoir.

We look forward also with great confidence to the beneficial operation of the Canal, in facilitating the efforts now in progress for the cultivation of Saugor Island. The success of those efforts will proportionally augment the Tolls of the Canal. Firewood, Chunam, Grain, Salt, and other articles, the produce of the Island, will be transported by the Canal to the Presidency; and if the speculation lately entered into by Messrs. Kyd and Co., for the manufacture of Salt on the Island of Saugor on account of Government should be successful, a large and certain increase of the Tolls to be levied from the Canal may be depended upon, as the whole of the Salt manufactured on the Island and its vicinity, would undoubtedly pass through the Canal.

If the expediency of constructing this work be measured with exclusive reference to the pecuniary returns likely to be realized from it for the first three or four years after its completion, we should refrain from recommending the undertaking.

We think, however, that there are reasonable grounds for believing that in the course of a few years, the produce of the Canal would give a profitable return for the capital expended upon it. But independently of these considerations, the work promises no inconsiderable benefit to the Honorable Company's direct interests.

1st. By expediting the loading and unloading of their ships at the New Anchorage, and by securing the more safe transit of their Cargoes to and from the Presidency.

2nd. By facilitating the embarkation and disembarkation of Troops proceeding to or from this Presidency by Sea

3rd. By its tendency to augment the manufacture of Salt.

To these advantages may be added the obvious benefits which the Mercantile community,

the Proprietors of Saugor Island, and the Inhabitants of the tract of country through which the Canal will pass, will derive from the execution of the proposed work. Sept. 30th. 1822.

We shall not further trespass on the time of the Governor General in Council. All the material facts necessary for the examination of the subject are clearly explained in Lieutenant Schalch's Memoir, and we shall conclude by expressing our earnest hope, that the Plan submitted by that zealous and intelligent Officer, may be approved and undertaken by Government.

We are, &c.

Approved.	*(Signed)*	HUGH MORRIESON, *Captain.*
,,	,,	G. BALLARD.
,,	,,	G. J. GORDON.

The above Draft Report was adopted, dated on this day, and addressed to the Secretary to Government in the Territorial Department.

The following Letter was received from the Secretary to Government, Territorial Department. Oct. 7th, 1822.

No. I. *e.*

No. 717.

To H. SHAKESPEARE, ESQ.
CAPTAIN H. MORRIESON.
G. J. GORDON, AND G. BALLARD, } ESQRS.

Committee for Reporting on Lieutenant Schalch's Plan.

Territorial Department, Revenue.

GENTLEMEN,

I am directed by His Excellency the Most Noble the Governor General in Council, to acknowledge the receipt of your letter dated the 30th ultimo, together with the Report and Plans which accompanied it.

2. Your Committee have justly understood it to be the wish of Government to come to a decision on the subject at an early period, in order that every advantage may be taken of the Dry season now commencing.

3. His Lordship in Council entirely agrees with you in preferring the Plan proposed by Lieutenant Schalch to that suggested by Mr. Wood, by whom indeed the proposition was avowedly founded on partial data, but who is not the less entitled to the acknowledgments of Government, for having brought the matter to its notice in a distinct shape.

4. Lieutenant Schalch's Plan and Estimate appear to be the result of an accurate examination of the country, and of much careful and judicious consideration of the subject. His conclusions, therefore, in so far as they relate to the professional points at issue, may apparently be fully relied on.

Oct. 7th 1822

5. His Lordship in Council is disposed to concur with you in opinion, that the proposed work will not only be very beneficial to the community, but will ultimately yield to Government a return more than sufficient to replace the capital expended.

6. There are, however, some points on which, before finally determining on the undertaking, His Lordship in Council is desirous of receiving further information, which doubtless you have omitted to furnish, only by reason of your conviction of the general expediency of the Plan, and of your persuasion that Government was very anxious for an immediate reply to the reference made to you.

First. As to the probability of an increase or decrease in that class of Shipping for the conveyance of the Cargoes, of which Lieutenant Schalch appears to think that the Canal would chiefly be employed.

Secondly. Whether, assuming (what His Lordship in Council believes to be now certain) the successful issue of the undertaking to clear Saugor Island, any vessels that now come up to Calcutta, would discharge and take in their Cargoes at the New Anchorage.

Thirdly. As to the probable extent of the Country Trade, which would pass through the Canal, considered in relation to the main articles of Salt, Firewood, Charcoal, Chunam, Rice, &c.

Fourthly. The advantage of the Canal in providing a safe and expeditious communication with the Islands and Roadsteads of Saugor and its vicinity, during the unfavorable Monsoon, when there is great difficulty in sending Vessels down the River, and much risk in employing the ordinary Country Craft at all, should be separately considered, and the degree in which the difficulty and risk in question is practically experienced, or is likely to be experienced, should be specifically explained, with reference both to the Shipping of the Port and to the Country Trade, including in the latter the concerns of the Saugor Island Proprietors.

7. On these points, any opinions now given must necessarily be, to a certain extent, hypothetical; but you will of course endeavour to render the information furnished as specific as possible.

8. It will apparently be useful to obtain written opinions from some of the principal Mercantile establishments at Calcutta, particularly on the First, Second, and Fourth points.

9. With regard to the Third and Fourth points, it seems desirable to consult the Salt Agent of the 24-Pergunnahs, the Collectors of Sea and Inland Customs, the Collector of the 24-Pergunnahs, the Saugor Island Society, and Gentlemen engaged in subsidiary undertakings on that Island.

10. From a correspondence between the Society and the Board of Customs it appeared, that for the conveyance of 200 maunds of Firewood from Saugor, a boat was required, of which the daily charge was one rupee and eight annas, and that five days were consumed in landing the wood, and in the passage to Calcutta. This too would appear to have been the expense incurred during the favorable season of the year. Now if this afford a correct estimate of the probable charge of conveying the produce of Saugor, the Sunderbuns, and the adjoining country to the Presidency, there would apparently be little difficulty in shewing, that without reference to the immediate risk, the Canal would produce a large saving of expense, both by shortening the passage, and, by enabling the Merchants to use other and cheaper tonnage than will answer in lower parts of the River Hooghly. Further enquiry would probably enable you to multiply similar results; and His Lordship in Council presumes, there can be no difficulty in calculating accurately the probable period of the passage through the Canal.

11. As above intimated, His Lordship in Council conceives that the success of the Saugor undertaking is now certain. But assuredly it is a greater recommendation to the present work, if it can be shewn, that it will materially facilitate the clearing of that Island profitably.

On this point, the testimony of the gentlemen engaged in the undertaking may be held to be conclusive, though their general opinions in favor of the Canal might naturally receive (without their being conscious of it) a bias from the consideration of the benefit they were likely to derive in the particular speculation. Oct. 7th 1822.

12. Every thing saved or gained to the community, may fairly be reckoned as a corresponding benefit to Government, whether Government think proper to share in the gain through a Tax, or Toll, or not.

13. If it be clearly shewn, that the advantage derived by the public affords a full return for the capital to be expended, that is sufficient evidence to the positive expediency of the work. To judge, however, of its relative importance, it is desirable to ascertain as nearly as possible, the actual extent of the advantage to the community, measured as is ordinary in all statements relating to commercial concerns. For the same purpose likewise, it is the wish of Government, that reference should be had to the probable rate and amount of Toll which could be collected, and on this head you will naturally advert to the rates fixed by the Regulations specified in the margin. The Revenue Accountant will furnish you, if desired, with a Statement of the Collections. XVIII. 1806. VII. 1810. IV. 1813.

I have the honor to be,

Gentlemen,

Your most obedient servant,

(*Signed*) HOLT MACKENZIE,

Secretary to the Government.

COUNCIL CHAMBER,
3rd October, 1822.

The following Papers returned from circulation. Oct. 27th 1822.

Secretary's Office, Fort William, 22nd October, 1822. No. 8.

The Secretary to the Committee on Lieutenant Schalch's Plans, circulates a Letter from Government, under date the 3rd instant.

Three Draft Letters, with Queries for distribution, drawn up by the President, are also sent for consideration; and an Abstract of the Plan for opening a Canal between Tolly's Nala and Channel Creek.

No. I. *f.*

To THE BOARD OF CUSTOMS AND SALT, AND TO THE MARINE BOARD. No. 9

GENTLEMEN,

I have the honour to forward to you Copy of a Letter from Mr. Secretary Mackenzie, under date the 3rd instant.

The Committee appointed by Government to Report on the Plan submitted by Lieutenant Schalch for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining your sentiments on the several points on which the Government have required further information.

In addition to those noticed by Mr. Mackenzie, the following points appear to demand notice, and the Committee will be obliged by such information respecting them, as the Board may be enabled to afford

Oct. 27th. 1822.

1st. What is the annual average of the number, description, and tonnage of River craft, employed in the loading and unloading of the Honorable Company's Ships at or below Diamond Harbour, and the cost per maund or ton, incurred in the conveyance of the Cargoes?

2nd. What time is usually occupied in the transport of Cargoes at different Seasons of the year, and how far is it likely to be shortened by the construction of the proposed Canal?

3rd. What has been the annual loss of Craft, or otherwise, in the transport of Cargo to and from the Honorable Company's Ships lying at or below Diamond Harbour; the estimated value of the goods belonging to the Company so lost; and how far would such loss be averted by the opening of the Canal?

4th. Would the route by the Canal reduce the present charges of transport; and to what extent?

5th. What quantity of Salt is usually manufactured per annum at the Aurungs lying Eastward of the Hooghly, and in the vicinity of the proposed line of the Canal; and of that quantity how much is ordinarily brought by land or water to Calcutta and its neighbourhood?

6th. What has been the total amount during the last 4 or 5 years of freight paid for sloops employed in carrying men, and bringing up Troops from the Honorable Company's or other Ships at Diamond Harbour, or the New Anchorage.

The Committee are of opinion that it would materially assist them in drawing some conclusion as to the benefit which would accrue from the Canal to the Inland Trade, if the Board could obtain from the Collector of Inland Customs a Statement, shewing the Quantity and Description of Goods passing to and from Calcutta on the Diamond Harbour Road within a twelvemonth.

In conclusion, I am requested to observe, that, as the Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will be obliged by the Board's favouring them with their reply to this address at their earliest convenience.

I have, &c.

No. I. *g*.

TO MESSRS. PALMER & Co.
——— ALEXANDER & Co.
——— COLVIN & Co.
——— FERGUSSON, CLARKE & Co.
——— CRUTTENDEN & Co.
——— McINTOSH & Co.
——— HOGUE, DAVIDSON & Co.
——— McCLINTOCH, & Co.
——— STUART, ROBERTSON & Co.

GENTLEMEN,

The Committee appointed by Government to report on the Plan submitted by Lieutenant Schalch, for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining your sentiments on such of the following Queries, and likewise on any other point connected with the general object of the Plan, as it may be in your power to afford them information.

1st. As to the probability of an increase or decrease in the class of shipping for the conveyance of the Cargoes of which the Canal would be chiefly employed.

2nd. Whether in the event of the Canal being constructed, (assuming the successful issue of the undertaking to clear Saugor Island,) vessels would be likely to discharge and take in their Cargoes at or below Diamond Harbour, in preference to coming up to Calcutta? Oct. 27th, 1822.

3rd. As to the probable extent of the Country Trade which would pass through the Canal, considered in relative [relation] to the main articles of Salt, Firewood, Charcoal, Chunam, Rice, &c.

4th. As to the advantage likely to result from the Canal in providing a safe and expeditious communication with the Island and Roadsteads of Saugor, and its vicinity, during the unfavorable Monsoon; and whether any, and what difficulty is experienced at that Season in sending vessels down the River, or in employing the Country Craft in the conveyance of Cargoes to the Shipping at or below Diamond Harbour.

5th. What is the cost per maund or ton (as the case may be) in the transport of Cargo to and from Ships at or *below Diamond Harbour?* What description of Boats are chiefly employed? What time is occupied in the passage to Diamond Harbour and the New Anchorage respectively? And what the difference of rate at different Seasons of the year?

6th. What is the rate of Insurance incurred in the transit of Goods, insured from and to the New Anchorage and Diamond Harbour, and in what degree is the rate likely to be reduced by the greater facility and security which may be expected to result from the proposed Canal?

As the Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will be obliged by your replying to the above Queries at your earliest convenience.

I have, &c.

No. I. *h.*

To THE SAUGOR ISLAND SOCIETY.

J. PALMER, ESQ.
J. KYD, ESQ.
LIEUT. PATON, AND
J. CALDER, ESQ.

1st. Paragraph same as to the Mercantile Houses.

2nd. and 4th, Queries ditto ditto.

3rd. What time is now taken up in each Month of the year in the passage from Saugor to Calcutta by the Craft usually employed in the transport of the articles* above mentioned? And what is the rate of Boat-hire at different Seasons of the year.

4th. Will the opening of the Canal, by diminishing the charges of Navigation, and improving the communication between Saugor and Calcutta, tend materially to facilitate the clearing of the Island.

I have, &c.

* Vide Qy. 3rd

To LIEUTENANT SCHALCH. To be requested to furnish his opinion as to the probable period of the passage through the Canal to Diamond Harbour and the Stations below it.

An Estimate to be made as to the probable Revenue likely to arise from the Canal, with reference to the rates of Toll authorised by the Regulations to be levied in other Canals.

Approved, *(Signed)* H. MORRIESON, *Captain.*
,, ,, G. BALLARD.
,, ,, G. J. GORDON.

Oct 27th 1822.

No I. *i.*

ABSTRACT.

No. 10 ***Outline of a Plan for forming a Canal communication between Tolly's Nullah and Channel Creek.***

A reference to the 19th Map in Rennell's Bengal Atlas, with the following abridged description of Lieutenant Schalch's Plan will, it is presumed, convey a general idea of the proposed undertaking.

A Canal is proposed to be carried from Tolly's Nullah at Russapugly, (near Bassah in the above mentioned Map) crossing the Jheel, called in Rennell the Fresh Water Lake, nearly in a straight line to the Codally Creek, which opens into Channel Creek. From the main branch two Canals of communication with the River Hooghly are projected, one to join it at Diamond Harbour, and the other at Rangafulla.

The former strikes off from the main branch near the village of Columbee, and the other near Rangafulla. The breadth of the Canal is such, as to admit two of the largest sized Country Boats to pass each other with ease in every part, and at the lowest state of the tide. The breadth is 70 feet at low water and 90 feet at high water spring tides, with a depth varying from 6 to 14 feet, according to the state of the tide in the Hooghly. At the lower extremity of the Canal, and at the points of communication with the River, Lock-gates are to be fixed for the purpose of retaining a sufficient supply of water in the Canal from Tolly's Nullah during the latter part of the Ebb, at which time the communication with the River will be obstructed.

From the Codally Creek in the Map, there is a safe and easy Navigation through the existing Natural Channels in the Island of Saugor, by the Bugwakally and Dog Creek to the New Anchorage.

The situation of the New Anchorage is not named in the Map, it lies, however, between the Mizen Sand and Saugor Island, and occupies the place of the word Channel in the above mentioned Map.

The formation of Wet Docks, into which ships of the largest draught may haul for the purpose either of repairing, or taking in and delivering Cargo at Diamond Harbour and the New Anchorage, forms a prominent feature of the Plan.

Oct. 27th 1822

Read the last numbered (8-9-10) Documents.

The following additional Draft was proposed.

No. I. *j*.

C. TROWER, ESQ.
Collector 24-Purgunnahs.

1st Part.

Sending him the outline Plan, and a Copy of Mr. Mackenzie's Letter.

Request such information as he may be able to give on any of the points adverted to by Mr. Mackenzie

In particular, regarding the Produce and Internal Commerce of the country in the neighbourhood of the proposed Canal.

What is the amount of the Julhur [Julkur] Revenue paid to Government on account of the Eastern Canal and Tolly's Nullah; and what may be estimated as the probable Revenue to be derived from renting the Fisheries of the New Canal when finished?

No. I. *j*.(1)

RESOLUTION.—Agreed that the Drafts, &c. with the amendments noted in circulation, form the basis of the communications to be addressed with reference to the enquiries required by the (6th to 9th Paragraphs inclusive) Letter from the Secretary to Government in the Territorial Department of the 3rd instant.

The Secretary submits for consideration, that Copies of the Maps and Plans connected with the Saugor Canals be prepared for record in his office.

RESOLUTION.—Not admitted to be requisite

No. II.

Calcutta, 17th February, 1823

At a Meeting of the Special Committee, held at the house of Henry Shakespeare, Esq.

President.

Present, H. SHAKESPEARE, ESQ.

Members.

Absent, CAPTAIN H MORRIESON.

Absent, G. J. GORDON, } ESQRS.
Present, G. BALLARD, }

Oct 28th 1822

Read and approved the intermediate Proceedings since the Meeting of the 28th October last

The following Letters were addressed agreeably to Drafts submitted, and Resolution adopted at the Meeting of the 28th October last.

Oct. 29th 1822

No. II. *a.*

No. 1.

To THE SECRETARY TO THE BOARD OF TRADE.

SIR,

I have the honor to forward a Copy of a Letter from Mr. Secretary Mackenzie, under date the 3rd instant.

2. The Committee appointed by Government to report on the Plan submitted by Lieutenant Schalch for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining the sentiments of the Board of Trade on the several points on which the Government have required further information.

3. In addition to those noticed by Mr. Mackenzie, the following points appear to demand notice, and the Committee will be obliged by such information respecting them as the Board may be enabled to afford.

1st. What is the annual Average of the Number, Description, and Tonnage of the River Craft employed in the loading and unloading of the Honorable Company's Ships at or below Diamond Harbour, and the cost per maund or ton, incurred in the conveyance of the Cargoes?

2ndly. What time is usually occupied in the transport of Cargoes at different Seasons of the year, and how far is it likely to be shortened by the construction of the proposed Canals?

3rdly. What has been the annual loss of Craft or otherwise, in the transport of Cargo to and from the Honorable Company's Ships lying at and below Diamond Harbour, the estimated value of property so lost to the Company, and how far would such loss be averted by the opening of the Canal?

4thly. Would the Route by the Canal reduce the present charges of transport, and to what extent?

In conclusion, I am requested to observe, that as the Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will be obliged by the Board's favoring them with their reply to this address at their earliest convenience.

I have &c.

FORT WILLIAM,
28th October, 1822.

(Signed) R. C. FAITHFULL, *Captain*,
Secretary, Special Committee Lieutenant Schalch's Plan.

No. 11. *b*.

Oct. 29th. 1822

No. 2.

TO THE SECRETARY TO THE BOARD OF CUSTOMS, SALT AND OPIUM

SIR,

I have the honor to forward a Copy of a Letter from Mr. Secretary Mackenzie under date the 3rd instant.

2. The Committee appointed by Government to report on the Plan submitted by Lieutenant Schalch, for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining the sentiments of the Board of Customs, on the several points on which the Government have required further information.

3. In addition to those noticed by Mr. Mackenzie, the following points appear to demand notice, and the Committee will be obliged by such information respecting them as the Board may be enabled to afford.

1st. What has been the annual amount in tons, and value in Rupees, of Goods laden on, or unladen from, Ships while lying at Diamond Harbour, or places below it?

2ndly. Would the route by the Canal reduce the present charges of River transport, and to what extent?

3rdly. What quantity of Salt is usually manufactured at the Aurungs lying Eastward of the Hooghly, and in the vicinity of the proposed Line of the Canal, and of that quantity how much is ordinarily brought by land or water to Calcutta and its neighbourhood?

4thly. What time is usually occupied in the transport of Cargoes, or articles of home consumption at the different Seasons of the year, between Calcutta and Diamond Harbour, and Saugor Island, and how far is it likely to be shortened by the construction of the Canal?

The Committee are of opinion that it would materially assist them in drawing some conclusion as to the benefit which would accrue from the Canal to the Inland Trade, if the Board could obtain from the Collector of Inland Customs a Statement, shewing the Quantity and Description of Goods passing to and from Calcutta on the Diamond Harbour Road within a twelvemonth.

In conclusion, I am requested to observe, that as the Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will be obliged by the Board's favoring them with their reply to this address at their earliest convenience.

I have, &c. &c.

FORT WILLIAM, (*Signed.*) R. C. FAITHFULL, *Captain*,
28th October, 1822. *Secretary, Special Committee Lieutenant Schalch's Plans*

Oct 28th
1822

No. II. c

No. 3.

To THE SECRETARY TO THE MARINE BOARD,

Fort William.

SIR,

I have the honor to forward a Copy of a Letter from Mr. Secretary Mackenzie, under date the 3rd instant.

2. The Committee appointed by Government to report on the Plan submitted by Lieutenant Schalch, for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining the sentiments of the Marine Board on the several points on which the Government have required further information.

3. In addition to those noticed by Mr. Mackenzie, the following points appear to demand notice, and the Committee will be obliged by such information respecting them as the Board may be enabled to afford.

1st. What has been the total amount during the last four or five years of Freight paid for Sloops employed in carrying down and bringing up Troops from the Honorable Company's or other Ships at Diamond Harbour or the New Anchorage?

2ndly. What is the cost per maund or ton incurred in the conveyance of Goods or supplies to and from Ships at Diamond Harbour or the New Anchorage?

3rdly. What time is usually occupied in the transport of Cargoes, &c. at different periods of the year, between Calcutta and Diamond Harbour, and Calcutta and the New Anchorage?

4thly. What has been the annual amount of actual loss of Craft employed under the Marine Board, or at what per cent. are the losses estimated of Goods embarked on River Craft for transport to or from Diamond Harbour and the New Anchorage?

5thly. Would the Route by the Canals reduce the present charges of transport of Troops, Stores, or Cargo, and to what extent?

In conclusion, I am requested to observe, that as the Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will be obliged by the Board's favoring them with their reply to this address at their earliest convenience.

I have, &c.

FORT WILLIAM,
28th October 1822.

(Signed) R. C. FAITHFULL, *Captain,*
Secretary, Special Committee Lieutenant Schalch's Plans

No. II. d.

No 4

To C. TROWER, ESQ.

Collector 24-Purgunnahs.

SIR,

I have the honor to forward a Copy of a Letter from Mr. Secretary Mackenzie, under date the 3rd instant.

2. The Committee appointed by Government to report on the Plan submitted by Lieutenant Schalch for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining such information as you may be able to afford on all or any of the points adverted to by Mr. Mackenzie, but more particularly

regarding the Produce and Internal Commerce of the country in the neighbourhood of the proposed Canal. Oct. 29th. 1822.

3. A Statement of the amount of the Julhur [Julkur] Revenue paid to Government, on account of the Eastern Canal and Tolly's Nullah, with an Estimate of what may be the probable amount of Revenue to be derived from renting the Fisheries of the New Canal when finished, are points which the Committee also wish you to embrace in your reply to this communication.

4. The Committee are anxious to make an early report to Government on the subjects to which their attention has been directed, and they will, therefore, be obliged by your furnishing them at your earliest convenience with the information requested.

I have, &c.

FORT WILLIAM, (*Signed*) R. C. FAITHFULL, *Captain*.
28th October, 1822 *Secretary, Special Committee Lieutenant Schalch's Plans.*

No. II. *e*.

No 5.

To THE SUB-ACCOUNTANT GENERAL,
Accountant Revenue Department, &c. &c.

SIR,

The Committee appointed by Government to report on a Plan submitted by Lieutenant Schalch, for constructing a Canal from Calcutta to Channel Creek, have directed me to request, with reference to a Letter from Mr. Secretary Mackenzie, (an Extract from which is annexed,) you will furnish for the information of the Committee, a Statement of Canal Collections made in any late year; exhibiting also the several rates of Toll levied on the Transit of Goods, &c through the Canals.

I have, &c

FORT WILLIAM. (*Signed*) R. C. FAITHFULL, *Captain*,
28th October, 1822 *Secretary, Special Committee Lieutenant Schalch's Plans*

No. II. *e*.[1]

Extract from a Letter addressed by the Secretary to Government in the Territorial Department, under date the 3rd October, 1822, to the President and Members of the Committee for reporting on Lieutenant Schalch's Plans.

" For the same purpose likewise, it is the wish of Government that reference should be "had to the probable rate and amount of Toll which could be collected, and on this head "you will naturally advert to the rates fixed by the Regulations specified in the margin. XVIII. 1806. VII. 1810. IV 1813.
"The Revenue Accountant will furnish you, if desired, with a Statement of the Collections."

A true Extract,

(*Signed*) R. C. FAITHFULL, *Captain*,
Secretary, Special Committee Lieutenant Schalch's Plans.

No. II. *f.*

CIRCULAR.

To

Oct 29th. 1822

GENTLEMEN,

The Committee appointed by Government to Report on the Plan submitted by Lieutenant Schalch, for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining your sentiments on such of the following Queries, and likewise on any other point connected with the general object of the Plan, as it may be in your power to afford them information.

1st. As to the probability of an increase or decrease in the class of Shipping for the conveyance of the Cargoes of which the Canal would be chiefly employed.

2ndly. Whether in the event of the Canal being constructed, (assuming the successful issue of the undertaking to clear Saugor Island,) vessels would be likely to discharge and take in their Cargoes at or below Diamond Harbour in preference to coming up to Calcutta?

3rdly. As to the probable extent of the Country Trade which would pass through the Canal, considered in relation to the main articles of Salt, Firewood, Rice, &c.

4thly. As to the advantage likely to result from the Canal in providing a safe and expeditious communication with the Island and Roadsteads of Saugor and its vicinity, during the unfavorable Monsoon, and whether any and what difficulty is experienced at that season in sending vessels down the River, or in employing the Country Craft in the conveyance of Cargoes to the Shipping at and below Diamond Harbour?

5thly. What is the cost per maund or ton (as the case may be) in the transport of Cargo to and from Ships at Diamond Harbour, Rangafulla, and the New Anchorage, or Saugor respectively; what description of Boats are chiefly employed, and what time is occupied in the passage to and from Diamond Harbour and the New Anchorage respectively, and what the difference of rate at different seasons of the year?

6thly. What is the rate of Insurance incurred in the transit of Goods insured from, and to Diamond Harbour and the New Anchorage, and in what degree is the rate likely to be reduced by the greater facility and security which may be expected to result from the proposed Canal?

The Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will, therefore, be obliged by your replying to the above Queries at your earliest convenience.

I am, &c. &c.

FORT WILLIAM, *(Signed)* R. C. FAITHFULL, *Captain,*

28th October, 1822. *Secretary, Special Committee Lieutenant Schalch's Plans*

The above Circular was numbered and addressed as follows ; viz.

No. 6. To MESSRS. PALMER & Co.

No. 7. ,, ALEXANDER & Co.

Oct 30th. 1822. No. 8. ,, ,, COLVINS & Co.

No. 9. ,, FERGUSSON, CLARK & Co.

No. 10. ,, CRUTTENDEN & Co.

No. 11. ,, McINTOSH & Co.

No. 12. ,, HOGUE, DAVIDSON & Co.

No. 13. ,, McCLINTOCK & Co.

No. 14. ,, STEWART, ROBERTSON & Co.

No. II. *g*.

Oct 30th. 1822.

CIRCULAR.

To

Sir,

The Committee appointed by Government to Report on the Plan submitted by Lieutenant Schalch, for constructing a Canal from Calcutta to Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining your sentiments on such of the following Queries, and likewise on any other point connected with the general object of the Plan, as it may be in your power to afford them information.

1st. As to the advantage likely to result from the Canal in providing a safe and expeditious communication with the Island and Roadsteads of Saugor and its vicinity, during the unfavorable Monsoon, and whether any and what difficulty is experienced at that season in sending vessels down the River, or in employing the Country Craft in the conveyance of Cargoes to the Shipping at or below Diamond Harbour?

2ndly. As to the probable extent of the Country Trade which would pass through the Canal, considered in relation to the main articles of Salt, Firewood, Charcoal, Chunam, Rice, &c.?

3rdly. What time is now taken up, in each month of the year, in the passage from Saugor to Calcutta by the Craft usually employed in the transport of the articles just enumerated; and what is the rate of Boat-hire at the different seasons of the year?

4thly. Will the opening of the Canal by diminishing the Charge of Navigation, and improving the communication between Saugor and Calcutta, tend materially to facilitate the clearing of that Island?

5thly. What may be estimated as the probable future quantity of such articles, (enumerated in Query 2nd,) consigned by the Canal to the Presidency from Saugor Island, if the exertions of the Society in clearing the Island prove successful?

The Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will, therefore, be obliged by a reply to this communication at your earliest convenience.

I have, &c

Fort William,
28th October, 1822.

(*Signed*) R. C. FAITHFULL, *Captain*,
Secretary, Special Committee Lieutenant Schalch's Plans.

The above Circular was numbered and addressed as follows; viz.

No. 15. To THE SECRETARY TO THE SAUGOR ISLAND SOCIETY.
No. 16. „ JOHN PALMER, ESQ
No. 17. „ J. KYD, ESQ.
No. 18. „ LIEUT. C. PATON, *Asst Supt. of Buildings.*
No. 19 „ J. CALDER, ESQ.

Oct. 30th 1822

No. II. *h*.

No. 20.

To LIEUTENANT J. A. SCHALCH,

Deputy Assistant Quarter-Master General.

SIR,

With reference to the concluding part of the 10th Paragraph of Mr. Secretary Mackenzie's Letter of the 3rd instant, wherein "His Lordship in Council presumes there "can be no difficulty in calculating accurately the probable period of the passage through "the Canal," I am directed by the Committee to request you will furnish, in detail, your opinion on the probable duration of the passage at the several seasons of the year, up and down the Canal between Calcutta and Diamond Harbour, Rangafulla, and Channel Creek, adverting also to the time of passage by the Bugwakally and Dog Creek to the New Anchorage.

I have, &c.

R. C. FAITHFULL, *Captain*,

Secretary, Special Committee Lieutenant Schalch's Plans.

FORT WILLIAM,
28th October, 1822.

No. II. *i*.

Nov. 1st. 1822

No. 21.

To THE SALT AGENT,

Western Division, 24-Purgunnahs.

SIR,

The Committee appointed by Government to report on a Plan submitted by Lieutenant Schalch, for opening a Canal between Calcutta and Channel Creek, (an Abstract of which is annexed,) are desirous of obtaining your sentiments on such of the following Queries, and likewise on any other point connected with the general object of the Plan, as it may be in your power to afford information.

1st. As to the advantage likely to result from the Canal in providing a safe and expeditious communication with the Island of Saugor, and country to the Eastward in its vicinity, during the unfavorable Monsoon, and whether any and what difficulty is experienced in employing the Country Craft, or Boats between Calcutta and Diamond Harbour, and Channel Creek?

2ndly. As to the probable extent of the Country Trade which would pass through the Canal, considered in relation to the main articles of Salt, Firewood, Charcoal, Chunam, Rice, &c?

3rdly. What time is now taken up, in each month of the year, from Saugor Island to Calcutta by the Craft employed in the transport of the articles above enumerated, and what is the rate of their hire at the different seasons of the year?

4thly. What has been the annual amount of the actual losses within your Agency in the transit of Salt by the present route of the River Hooghly, and what proportion do the losses bear to the total amount of Salt sent from your Agency to Calcutta, or its vicinity, by the route in question?

The Committee are anxious to bring the subject under the consideration of Government as soon as possible, they will, therefore, be obliged by a reply to this communication at your earliest convenience.

I have, &c. &c.

(*Signed*) R. C. FAITHFULL, *Captain*,

Secretary, Special Committee Lieutenant Schalch's Plans.

FORT WILLIAM,
28th October, 1822.

The following Letter was received from the Accountant in the Revenue Department. Nov. 1st. 1822.

No. II. *j.*

To CAPTAIN R. C. FAITHFULL,

Secretary, Special Committee for reporting on Lieutenant Schalch's Plans. No. 1.

SIR,

I have to acknowledge the receipt of your Letter of the 28th instant, and agreeably to the request contained therein, have the pleasure to annex the collections at the different Government Canals for the last two years, but have no account of the rates.

Gross Collections.	In 1820-21. May to April,	In 1821-22. May to April.
Matabangah, &c. Rivers in Nuddea,	15,636 4 0	14,092 10 1
Banka Nullah, Narrainpore Khaul and Gowacolly Khaul in Midnapore, ...	8,257 12 3	7,516 14 0
Tolly's Nullah, ...	78,495 6 3	76,010 13 11
Balea Ghaut New Canal,...	17,686 4 4	17,674 12 5
	1,20,075 10 10	1,15,295 2 8

I am, &c. &c.

(Signed) C. MORLEY,
A. R. D.

FORT WILLIAM,
ACCOUNTANT GENERAL'S OFFICE,
The 30th October, 1822.

The following Letter was received from the Secretary to the Marine Board. Nov. 2nd 1822

No. II. *k.*

No. 171.

To CAPTAIN R. C. FAITHFULL, No. 2

Secretary, Special Committee Lieutenant Schalch's Plans

SIR,

I am directed to acknowledge the receipt of your Letter, dated the 28th instant, with its enclosures, and in reply to request, that you will submit to the Committee the following observations on the points of enquiry contained in Mr. Secretary Mackenzie's Letter, and Answers to the Queries more directly addressed by you to the Marine Board.

First. It is not to be expected, the Board instruct me to observe, according to present appearances, that the number of Ships trading to this Port, of such burthen as to render it necessary or advisable for them to load and unload at the New Anchorage, or Diamond Harbour, can be increased for some time. If freights to Europe should experience no material rise, it is rather to be apprehended that few, if any, private ships above (600) six hundred tons will be built for the Licensed or Country Trade, at least before those now employed of that description have disappeared. A diminution of the present number may therefore be looked for, although a few, chiefly perhaps under foreign colours, may still remain to occupy the New Anchorage, together with the Honorable Company's Ships.

Nov. 2nd 1822.

Secondly. Should the undertaking to clear Saugor prove successful, some of the largest Vessels that now come to Calcutta might, the Board think, be detained at the New Anchorage, if a safe passage for Cargo Boats were opened from the Anchorage to the Canal; but the inducement to remain there would chiefly depend on the formation of a Wet Dock, in which they might lay sheltered without being subject to the wear and tear of Cables, and the erection of adjacent Warehouses, in which Export Cargoes might be placed to await their arrival, and any portion of their Import Cargoes intended for re-exportation might be stored.

Thirdly. The extent of the Country Trade, considered in relation to the main articles of Salt, Firewood, Charcoal, Chunam, Rice, &c. which would pass through the Canal, would depend, the Board remark, as already noticed, on the relative advantages of Canal and River passage. If the former should be decidedly superior, it would of course gain the preference, and the export of Firewood and Charcoal from Saugor to Calcutta might be rendered thereby, if no toll, or only a trifling one existed, more considerable than could be expected under other circumstances.

Fourthly. If the banks of the Canal can be guarded from serious injury, and its bed from obstruction, or if obstructions occurring in the one case can be easily removed, and any damage taking place in the other can be readily repaired, the advantages of the Canal are likely, in the Board's opinion, to be very great during the unfavorable Monsoon, and will naturally increase, in the event of Saugor becoming a place of continued residence and occupation throughout the year, more especially if a Wet Dock should be formed in the vicinity of the New Anchorage for the reception of large Ships. The difficulty and risk attending the Navigation of River Craft below Calcutta in the S. W. Monsoon, depend so much on the description and quality of the Vessels employed, and the habits of those entrusted with their management, that it would indeed be difficult to afford a specific explanation of what is likely to be experienced, although the parties immediately concerned in employing and managing such Craft, may be able to afford information with regard to what has already been practically experienced.

Fifthly. The records of this office afford no sufficient reply to the first Question contained in your letter, the information required being properly obtainable from the Military Department, or the Military Board, or the Commissariat.

Sixthly. It is also necessary to refer you to these sources, together with the Board of Trade, Sub-Export Warehouse-keeper, for Answers to the 2nd, 3rd, 4th, and 5th Questions, as no River Craft are employed under the Marine Board for the transport of Troops, Stores, or Cargo.

2. It may be almost superfluous, the Board conceive, to suggest that while the advantages of any proposed undertaking for the public benefit are carefully enumerated and brought into conspicuous view, disappointment may be ultimately experienced, if the contingencies that may have effect on its completion, and also the influence of future contingency on its ulterior prospects are not examined with equal care and attention, and duly taken into account. The Committee may have ascertained the expense that will be required to finish the Canal, and afterwards to preserve it in a navigable state. If no unforeseen circumstances should be found to retard its completion or subsequently, to obstruct its operation, thereby enhancing its cost or impairing its utility, it ought to prove of decided public benefit; yet changes may, at no distant period, be effected in the ordinary Navigation of the River, which would be unfavorable to the expectation of its affording a full return for the capital to be expended. It is not unlikely, that the advantages of Steam Navigation may be experienced on the River to a considerable extent; before the Canal can be completed for use, more than one Steam Vessel may be constantly plying, and every such Vessel would be ready after attending a ship to sea, and not finding any inward-bound ship requiring her services, to tow several Cargo Boats of great capacity, or boats laden at

Saugor, or other small Craft up to Calcutta with the greatest expedition. Their services would be equally ready and desirable in the case of Cargo boats prepared for dispatch from Calcutta, when they had occasion to go down the River to assist inward-bound Ships on their passage up, and as such occupation would have the character of extra fare, occasioning little, if any addition to their necessary expenses, their charges would no doubt be extremely moderate, and their assistance be often looked for. Nov. 2nd. 1822.

3. This suggestion is offered by the Board to the consideration of the Committee, not with the view of conveying an opinion adverse to the undertaking, but merely to shew that while circumstances at present may be sufficiently favorable and strong to warrant its being entered upon, or even to call for the adoption of the scheme, it may be prudent to limit the estimate of its future utility and productiveness, by giving attention to such circumstances as might eventually conspire to abridge the difficulties which it is intended to obviate.

I have, &c. &c.

MARINE BOARD, *The* 31*st October*, 1822. *(Signed)* H. SARGENT, *Secretary.*

The following Letters were addressed with reference to the fifth division of the 1st Paragraph of the foregoing Letter, wherein it is stated that the Records of this Office afford no sufficient "reply to the first Query contained" in Letter No. 3, of the 28th ultimo, addressed to the Secretary to the Marine Board. Nov. 4th. 1822.

No. 11. *l.*

No. 22.

To MAJOR VAUGHAN,
Town Major.

SIR,

The Committee for reporting on Lieutenant Schalch's Plans, have requested me to refer the following Questions for your solution; viz.

1st. What has been the annual amount, during the last five years, of freight paid for Sloops or other River Craft employed in carrying down from, and bringing up to, Calcutta, Troops from the Honorable Company's or other Ships at Diamond Harbour, and the New Anchorage; at what rate per ton, or maund, are Sloops, &c. so employed paid?

2ndly. What has been the annual amount of Craft so employed during the period adverted?

3rdly. What is the period taken up in the passage at the different Seasons of the year, between Calcutta and Diamond Harbour and the New Anchorage?

The Committee are anxious to bring the subject of the Saugor Canal under the consideration of Government as soon as possible, they will, therefore, be obliged by your favoring them with a reply at your earliest convenience.

I have, &c.

FORT WILLIAM, 28*th October*, 1822. *(Signed)* R. C. FAITHFULL, *Captain,*
Secretary, Special Committee Lieutenant Schalch's Plans.

Nov. 4th. 1822.

No. II. *m.*

No. 23.

To CAPTAIN CUNNINGHAM,

Garrison Store Keeper, Fort William.

SIR,

The Committee for reporting on Lieutenant Schalch's Plans, have requested me to refer the following points to you for consideration ; viz.

1st. What has been the annual amount of losses in Stores or Supplies, (taken at the valuation they bear on your books,) shipped on Sloops or River Craft from your Department in the years 1809, 10, 11, and 12, and during the last five years, whether intended to be embarked on Ships at Diamond Harbour, or the New Anchorage, or for the consumption of Troops in their passage between those places and Calcutta ?

2ndly. What proportion do the losses in Stores or Supplies, so embarked, bear to the annual value of Government property issued from your Department in the years above enumerated, and for the purposes set forth ?

The Committee are anxious to bring the subject of the Saugor Canal under the consideration of Government without delay, and they will, therefore, be obliged by your furnishing a reply at your earliest convenience

I have, &c.

FORT WILLIAM,
28th October, 1822.

(Signed) R. C. FAITHFULL, *Captain*,
Secretary, Special Committee Lieutenant Schalch's Plans

The following Letter was received from MESSRS FERGUSSON & Co

No. II. *n.*

No. 3.

CAPTAIN R. C. FAITHFULL,

Secretary to the Committee on Lieutenant Schalch's Plans.

SIR,

We have to acknowledge the receipt of your Letter, dated 28th ultimo, requesting our sentiments on certain points connected with Lieutenant Schalch's Plan, for constructing a Canal from Calcutta to Channel Creek, and will now reply to the clauses enumerated in your letter, as far as we are immediately enabled.

To the 1st. It does not appear probable that Ships of a large burthen, such as usually complete their loading below, are likely to increase for the Trade of this port. Ships of that description formerly found employment in carrying grain to the Coromandel Coast and Bombay, for which they are not [now] required, and unless for Cargoes of Cotton to China, or Europe, it would seem that hereafter Vessels of moderate tonnage will be found more suitable to the general purposes of the port.

To the 2nd. There is a convenience in all cases for Ships to come off Town, but the dangers at the James and Mary, and in other parts of the River, coupled with the delay at times in coming up and going down, would no doubt be a strong inducement for Ships to remain below, particularly those of large size, were there increased facility with regard to their loading and unloading at Diamond Harbour, or lower down.

To the 3rd. The extent of Trade that would pass through the proposed Canal we cannot form any accurate estimate of. Nov. 4th. 1822

To the 4th. The difficulty of communicating with Shipping at Saugor and its vicinity in the South West Monsoon is occasionally great, and very tedious; and from the latter circumstance, additional opportunity must be afforded for the plunder that is frequently detected in packages of Goods on their reaching a distant destination. The intended Canal, by removing objections of that nature, would, we should think, hold out an advantage that Shippers of Goods would gladly avail of.

To the 5th. River Sloops are usually employed to carry Cargo to Ships at the lower Stations in the River, sometimes Bhurs are used, but this is not frequent. Sloop Hire is generally paid at so much per bag of the Sloop's burthen: the rates in the fair Monsoon are about as follows:—to Diamond Harbour 1 anna 3 pie to 1 anna 6 pie per bag; to Kedgeree 2 annas to 2 annas 3 pie per bag; to Saugor 2 annas 6 pie to 3 annas 6 pie per bag. In the South-West Monsoon these rates are about doubled.

To the 6th. The Insurance premium on Ships from Calcutta to Sea, is calculated at 1 per cent., but a specific Insurance on Cargo Sloops is never required to be made, as the Offices include that risk in the general one of the voyage. If Ships did not come higher than Diamond Harbour, and that Goods could be sent there or to Saugor without any risk, that [then] it would be an object to pay for being insured against; a reduction in the premiums would probably ensue to the extent of ⅛ per cent. on the value usually covered on Sea voyages. Sloops are seldom less than two or three weeks in a trip to Saugor and back: of course in the N. E. Monsoon they go down quickly, but are longer of returning, and in the S. W. Monsoon it is the contrary.

We are, &c. &c.

CALCUTTA, *(Signed)* FERGUSSON & Co.

1st November, 1822.

The following Letter was received from the Garrison Store-keeper of Fort William. Nov. 7th 1822

No. II. *o.*

No. 90.

To CAPTAIN FAITHFULL,

Secretary, Special Committee Lieutenant Schalch's Plans. No. 1.

SIR.

I have the honor to acknowledge the receipt of your letter. No. 23, of the 28th ultimo.

2nd. On reference to the Documents of this Office, it does not appear that any losses have been sustained in this Department by the actual wreck or sinking of any of the vessels employed for the transport of Government Stores or Provisions, between this and Diamond Harbour and the New Anchorage, or Saugor.

3rd. But though actual losses may not have occurred, it may perhaps be useful to the Committee, in enabling it to draw a comparison between the expenses of a River conveyance as it now is, and what it would be were a Canal formed, to state the

Nov. 7th 1822 period for which provisions are generally sent from this Department in Sloops for Troops for their trip, both to and from Saugor, or the New Anchorage; viz. from ten to twelve days, according to the Season, and to Diamond Harbour for half that time; but it depends so much on the favorable state of the weather, that the passage has sometimes even exceeded by one-half the above stated time, and caused considerable extra expense, as well as inconvenience, in increasing the supplies.

4th. It is very seldom that this Department has the hiring of vessels for the conveyance of articles; as far therefore, as relates to the difference of expense for Vessels of that description, which are required for the safe Navigation of a large River, and those which would be sufficient for a Canal, I must refer the Committee to better information.

I have, &c.

(*Signed*) W. CUNNINGHAM,
G. S. K.

FORT WILLIAM,
GARRISON STORE-KEEPER'S OFFICE,
The 6th November, 1822.

The following Letter, with enclosures, was received from the Secretary to the Board of Customs, Salt and Opium.

No. II. *p.*

No. 5

To CAPTAIN R. C. FAITHFULL,

Secretary to the Special Committee for Reporting on Lieut. Schalch's Plan of a Canal, &c.

SIR,

I am directed by the Board of Customs, Salt and Opium, to acknowledge the receipt of your Letter, dated the 28th ultimo, with its enclosure, and in reply to request, that you will submit to the Committee the accompanying Copies of the Papers noted in the margin, together with the enclosed separate Statement of the Salt manufactured in the Aurungs to the Eastward of the River Hooghly, and ordinarily brought up to Calcutta and its neighbourhood.

Letter to Collector Sea Customs, 30th ultimo.
Reply to Ditto, dated 1st instant.
Letter to Collector Inland Customs, 30th ultimo.
Reply Ditto, 1st instant.

2. These Papers, in addition to the communication which was made to you from this office in the Marine Department, under date the 31st ultimo, will put the Committee in possession of all the information which it is in the power of the Board to collect from the Officers under their authority, on the points referred to them by the Committee.

I have, &c. &c.

(*Signed*) H. SARGENT,
Secretary.

BOARD OF CUSTOMS, SALT AND OPIUM.
The 6th November, 1822.

Nov 7th 1822.

No. II. *p.*(1)

No. 6

To G. J. SIDDONS, ESQ.
Collector of Sea Customs at Calcutta

SIR,

Customs With reference to the annexed Copy of an "Outline of a Plan for forming a Canal communication between Tolly's Nullah and Channel Creek," now under the consideration of Government, I am directed to request that you will ascertain and report as accurately and as quickly as you possibly can, such particulars as the Records of your own Office may furnish, or as can be obtained from those engaged in Trade, on the following points :—

1st. What has been the annual amount in Tons, and value in Rupees, of Goods laden on, or unladen from Ships, while lying at Diamond Harbour or places below it?

2ndly. Would the route by the Canal reduce the present charges of River transport, and to what extent?

Lastly. What time is usually occupied in the transport of Cargoes or articles of Home consumption at the different Seasons of the year between Calcutta and Diamond Harbour and Saugor Island, and how far is it likely to be shortened by the construction of the Canal?

I have, &c.

BOARD OF CUSTOMS, SALT AND OPIUM, *(Signed)* H. SARGENT, *Secretary.*
The 30th October, 1822.

No. II. *p.*(2)

To H. SARGENT, ESQ.
Secretary to the Board of Customs.

SIR,

I have to acknowledge the receipt of your Letter, dated 30th ultimo, calling for [a] report connected with a Plan for a Canal communication between Tolly's Nullah and Channel Creek, but am quite at a loss for the means of furnishing the Board of Customs with the information required.

2. With regard to the 1st Query, I beg to represent, that all applications for exporting Goods are headed thus: "Please to pass to the Ship A. B. bound to C." &c. They are passed through this Office, therefore, as if direct to the Ship for which they are intended. Sometimes, indeed, Ships have dropped below Calcutta before fully laden, and then a portion of their Cargo is taken down to them in Sloops or Boats. If the Ships have dropped to any part of the River below Mugga Thannah, (which is but a very short distance below Calcutta,) a Ticket is given with each Sloop or Boat load, for the satisfaction of the Tide-waiter there stationed, by the Tide-waiter who passed the goods on regular Perwanahs issued from this Office. But the Tickets in question are not filed, or carefully kept by the Tide-waiter at Mugga Thannah, because they afford, of themselves, full proof that the goods mentioned in them have been regularly passed from my Wharf or Ghauts. Goods so passed are often, no doubt, put on board vessels on their way down the River before they arrive at Diamond Harbour; and of the quantity or value of any so shipped, or of any shipped at Diamond Harbour itself, or at places below it, I can have no information.

Nov. 7th. 1822. 3. Except with regard to the Honorable Company's Ships, which owing to their large size cannot come high up the River, no Import Cargo is allowed, under the Regulations, to be landed from Vessels until they have arrived off Calcutta, nor until their Commanders have complied with certain prescribed forms, I can therefore have no information to give as to the quantity or value of Goods unladen at Diamond Harbour, or places below it.

4. With respect to the Honorable Company's Ships, of course the Import Warehouse keeper can render an account of the annual quantity and value of Goods brought up from them from Diamond Harbour, or places below it, and the Export Warehouse-keeper can furnish information on the same points, touching Cargo dispatched on Sloops or Boats from his Department to the Stations in question.

5. For the reasons above given, as well as from not being at all acquainted with the charges of River transport, it is not in my power to make any return to the 2nd Query.

6. It is equally out of my power to reply to the last Query, being entirely uninformed on such matters, officially or otherwise. The Import and Export Warehouse-keepers, who have to pay, I conclude, for the hire of Sloops or Boats employed in taking Cargo down to, or bringing it up from the Honorable Company's Ships at Diamond Harbour or Saugor Island, would be able, I suppose, to furnish the Board with information on the points noticed in this Query, as well upon that included under the 2nd Query.

7. Perhaps a Circular Letter addressed by you to the principal Mercantile Houses in Calcutta, might elicit the information required by the Board on the several matters in question. They relate to subjects upon which I can derive no knowledge from the records of my Office, not at all connected with my public duties, and with regard to which, as a private individual, I am wholly ignorant.

I have, &c.

CALCUTTA GOVERNMENT SEA CUSTOMS' HOUSE, *The* 1*st November*, 1822. (*Signed*) G. J. SIDDONS, *Collector of Sea Customs*

No. II. *p.*(3)

To H. J. CHIPPENDALL, ESQ

Collector of Inland Customs and Town Duties at Calcutta.

SIR,

Customs I am directed to transmit to you the annexed extract of a letter of yesterday's date from the Secretary to the Special Committee appointed to report on Lieutenant Schalch's Plans, for constructing a Canal from Calcutta to Channel Creek, and to request that you will furnish the information therein required, with as much accuracy and dispatch as the case will admit of.

I have, &c.

BOARD OF CUSTOMS, SALT AND OPIUM, *The* 30*th October*, 1822. (*Signed*) H. SARGENT, *Secretary*

No. II. p.[4]

Nov. 7th, 1822

To J. SWINTON,
J. P. LARKINS, AND } ESQRS.
THE HON'BLE C. R. LINDSAY,

Members of the Board of Customs.

GENTLEMEN

In reply to your Board's Orders, dated the 30th instant, forwarding a request of the Committee on the proposed Canal to Channel Creek, that I should state what Goods, and to what Amount, are usually exported by the Diamond Harbour Road, I beg to state, that the Records, of this Office do not supply the information required, inasmuch as the intended Route is never specified in the application for a Pass or Rowannah, but from the position of the Road I do not think it can be used in the transit of Goods to the interior, farther than the occasional supplies of the Deputy Harbour and Deputy Post Masters of Diamond Harbour and Kedgeree.

I have, &c.

CALCUTTA INLAND CUSTOM HOUSE
The 31st October, 1822.

(Signed) H. J. CHIPPENDALL,
Collector of Inland Customs.

(True Copies,)

BOARD OF CUSTOMS, SALT AND OPIUM,
The 6th November, 1822.

(Signed) H. SARGENT,
Secretary.

No. II. p.[5]

Statement of Salt manufactured in the Aurungs to the Eastward of the River Hooghly, and ordinarily brought up to Calcutta and its neighbourhood. No. 8.

24-Pergunnah's Agency.

Baumen Gottah, Gur Gottah, Culpee, Beerundhuree, Goladwarrah,	About 2,00,000 maunds of Salt imported annually at Calcutta from these places by the Route of Tolly's Nullah.

BOARD OF CUSTOMS, SALT AND OPIUM.
The 6th November, 1822.

(Signed) H. SARGENT,
Secretary.

Nov 9th. 1822. *The following Letter was received from* MESSRS. ALEXANDER & Co. *Calcutta, 9th November*, 1822.

No. II. *q.*

No. 9.

To CAPTAIN R. C. FAITHFULL,

Secretary, Special Committee Lieut. Schalch's Plans

SIR.

We have the pleasure to subjoin such information as we are capable of affording, in reply to the Queries contained in your Letter of the 28th ultimo.

1st. We do not anticipate any increase in the class of Shipping for the conveyance of the Cargoes for which the Canal would be chiefly employed, but rather the reverse, if the restrictions on the Tonnage of Ships engaged in the East Indian Trade be taken off or modified.

2nd. So many causes render it expedient for Vessels to come up to Calcutta, that we cannot suppose the accommodation of the Canal in the matter of unloading and loading would have much influence. Occasionally, perhaps, it would be an inducement, but only under particular circumstances.

3rd. This Query we are not competent to Answer.

4th. Accommodation of the Canal for the safer and more expeditious transport of Goods to the place with which it communicates cannot be doubted Much difficulty and delay attend the present mode, with occasional, but not frequent loss.

5th. The description of Boats employed are for unloading Ships, or loading Sloops of different sizes, carrying from 800 to 2,500 Bags of 2 maunds each, and Bhurs.

The rule [rate] of hire for a 1,000 Bag Sloop from Calcutta in the season of S. W. Monsoon.

Diamond Harbour is	125 Rs.	about 2	Annas per Bag,	
Kedgeree, ...	150	,, 3	,,	,,
New Anchorage,	250	,, 4	,,	,,

in the N. E. Monsoon about ⅓ less. From these places to Calcutta, when Sloops are returning, only one-half is charged of the respective rates of the two Monsoons.

Bhurs to

Diamond Harbour, each	12 Rs.	14 Rs.	16 Rs.
Kedgeree, ...	18 ,,	21 ,,	24 ,,
New Anchorage, ...	24 ,,	28 ,,	32 ,,

Both Sloops and Bhurs take about the same time in going and returning

From Calcutta to

Diamond Harbour from	2 to 2½ days
Kedgeree, ...	4 to 4½ ,,
New Anchorage, ...	5 to 5½ ,,

And they return from these places to Calcutta

From Diamond Harbour	4 to 4½ days.
Kedgeree, ...	5 to 6 ,,
New Anchorage, ...	6 to 7 ,,

during the latter end of N. E. Monsoon and greater part of S. West.

At present however, they go down in about a day less, and return in about a day or two more than what the above Statement shews. Nov. 9th 1822.

With respect to the rate of Insurance, we are not aware that the transport of Goods by a Canal would make any difference, as Goods are invariably insured from wharf to wharf. It might however in reference to the Inland Trade.

Regretting that we cannot so fully, as we could wish, answer the several Queries you have laid before us, for that purpose,

We remain, &c
(Signed) ALEXANDER & Co.

The following Letter, with Statement, was received from the Town Major of Fort William. Nov 11th. 1822

No. II. *r.*

No. 1139 *Service.*

CAPTAIN R. C. FAITHFULL, No. 10

Secretary, Special Committee to Lieutenant Schalch's Plan.

SIR,

In reply to your Letter of the 28th ultimo, I herewith enclose a Statement, which includes I believe replies to your Queries.

FORT WILLIAM,
TOWN MAJOR'S OFFICE,
11*th Nov.* 1822.

I have, &c.
(Signed) J. VAUGHAN,
Town Major

Nov. 11th. 1822.

No. II r.[1]

Statement

No. 11.

	No. of days to and from Diamond Harbour.	Sicca. Rs. As. P.	No. of days to and from Kedgeree.	Sicca. Rs. As. P.	No. of days to and from New Anchorage.	Sicca. Rs. As P.	Annual amount for last five years paid by Government to Contractor for conveyance of Troops.
1st. Rate from October to February both months inclusive generally about, ...	5 days.	0 0 0	6 to 7	0 0 0	8 to 9	0 0 0	In 1817, Sa. Rs. 30,021 7 3 ,, 1818, ,, 9,266 12 0 ,, 1819, ,, 6,060 2 6 ,, 1820, ,, 8,916 15 0 ,, 1821, ,, 5,716 3 0
Conveyance paid for each European in the above months, including Provisions, ...	...	5 1 3	...	7 0 6	..	10 8 0	
Ditto, ditto, for each Native. ...	..	3 1 9	...	4 3 6	...	6 5 3	Up to the 1st October, 1822, the payments made have been 26,000 Sa. Rs. which by the arrival of three more Regiments from Europe, and the departure of two from Calcutta, will increase the total payments of 1822 to Sa. Rs. 45 or 50,000.
2nd. Rate from March to September for both months inclusive generally.	6 days.	0 0 0	7 to 8	0 0 0	About 10 days	0 0 0	
For each European in above months, ...	...	5 7 6	...	7 13 0	...	10 15 0	In 1822, Sa. Rs. 41,000 0 3
For each Native ditto, ...	...	3 4 6	..	4 11 0	...	6 9 0	Total Sa. Rs. 1,00,981 8 0

The Records of this Office make no mention of any loss of Craft employed in conveyance of Troops during the last five years.

(*Signed*) J. VAUGHAN,
Town and Fort Major.

NOTE.—The Town Major's Statement, in the heading of the first charge for the contract conveyance of Troops, ending with the words "*including Provisions,*" the Secretary to obviate misconstruction, applied to Major Vaughan for an explanation of those words, his reply is recorded; viz. Nov. 11th. 1822.

"The Provisions are provided by Government, the Contractor only furnishes *Tonnage* at those rates per man I sent you. No 11½.

(*Signed*) J. VAUGHAN."

The following Letter was received from MESSRS. DAVIDSON AND CO. Nov. 13th 1822.

No. II. *s.*

To CAPTAIN FAITHFULL, No. 12

Secretary to the Special Committee Lieutenant Schalch's Plans.

SIR,

We have now the honor to acknowledge the receipt of your letter, under date the 28th ultimo; and to state in reply to the Queries therein proposed to us—

1st. That the class of Shipping for the conveyance of the Cargoes of which the Canal would be chiefly employed has been decreasing since the opening of the trade, and the probability is, that it (that class of Shipping) will decrease still further; should the Bill, now before the House of Commons, opening the trade to India to vessels under 350 Tons, be carried.

2ndly. In the event of the Canal being constructed, and Saugor Island cleared, there can be no doubt whatever, that vessels of 400 Tons and upwards, would prefer loading at the New Anchorage and its vicinity to coming up to Calcutta, unless indeed, there is a toll upon the Canal, which would materially increase the expense of conveyance.

3rdly. We are of opinion that the main articles of Salt, Firewood, Rice, &c. would principally pass through the Canal, and probably a great part of the Country Trade in other gruff goods, should the rate of Toll be moderate.

4thly. The advantages likely to result from the Canal, as regarding a safe and expeditious communication with the Island and Roadsteads at Saugor and its vicinity, during the unfavorable Monsoon, are likely to be very considerable, particularly if a proper establishment of Canal Craft be kept for that purpose; as the risk and delay experienced at that Season are generally very great, and it often happens, that Country Boats, employed in the conveyance of Cargoes to the Shipping at Diamond Harbour and Saugor, are totally unfit for the purpose, and frequently lost in the passage with valuable Cargoes.

5thly. The rate of Sloop hire to or from Diamond Harbour, per Ton, is 1/4 to 1/8; to or from Kedgeree 2 to 2/2; and to or from the New Anchorage or Saugor 2/8 to 3. The time occupied in the passage to and from Diamond Harbour by such Vessels, is eight days; to and from Kedgeree twelve days; and the New Anchorage and Saugor, fifteen days. These rates sometimes, but very seldom, vary at the different Seasons of the year.

6thly. Cargoes are always insured at and from Calcutta to the port or ports of destination, including the River risk.

We beg leave to remark in conclusion, that unless the expense of transport by the Canal is upon a very low scale, that Channel of conveyance, in our opinion, will not generally be resorted to.

We have, &c.

(*Signed*) DAVIDSON AND CO.

CALCUTTA,
November 12th, 1822.

Nov. 15th. 1822. *The following Letter was received from* LIEUTENANT *C.* PATON, *Assistant Superintendent of Buildings.*

No. II. *t.*

No. 2034

No. 13

To CAPTAIN FAITHFULL,

Secretary, Special Committee on Lieutenant Schalch's Plans.

SIR,

In reply to your Letter No. 18, of the 28th ultimo, I beg to state that in my opinion the Plan proposed by Lieutenant Schalch, for opening a Canal from Calcutta to Channel Creek, will, if carried into effect, be attended with very great advantages to the commercial interests of Calcutta, to the Native farmers in the neighbourhood of the Canal, and particularly to the Saugor Society.

Channel Creek being entirely sheltered from the effects of the South-West Monsoon by Saugor Island and Bhugwakhalee, affording a safe and easy communication through the Island with Dog Creek, which is nearly opposite to the New Anchorage, and in which all small Craft (should the weather be unfavorable for proceeding to the Shipping) could remain with the greatest security, are strong arguments in support of the Plan; whereas, if they went down the Hooglee, there is not a single Creek after passing Diamond Harbour, in which they could take refuge in the event of bad weather, and consequently the Navigation of the Hooglee, between Diamond Harbour and the New Anchorage, during the South-West Monsoon, is often not only very tedious, but extremely dangerous.

The two Canals of communication with the Hooglee from the main branch, appear to be of very great importance, by affording not only safe places of refuge in Stormy Weather, but an easy access from Tumlook, Gungena Khallee, Seebgunge, Meetakund and Oolabaria, for boats proceeding into the Sunderbunds and Saugor Island for Firewood.

By adopting the Plan generally, the clearing of Saugor Island will be ensured, and as almost all the Commercial Houses of Calcutta are deeply interested in its success, the energies of the Society, and of those holding Sub-grants, would be doubly increased. Saugor from being the haunt of tigers, would soon become the abode of a Mercantile community, and in a few years perhaps, the Port of Calcutta.

During the South-West Monsoon the rate of hire to the New Anchorage is nearly double what it is in the months of November, December, January and February; but as the Canal will render the Navigation equally safe at all Seasons of the year to the mouth of Dog Creek, Warehouses might be constructed on its banks for the deposit of Goods either for Export and Import, and a fixed Rate of hire for all seasons could easily be established. By this arrangement, Shipping might never come higher up the River than the New Anchorage, and consequently the danger always anticipated in getting over the James and Mary quicksands would be obviated, the rate of River Insurance would be diminished, and incalculable benefit would eventually not only result to the Mercantile interests, but to Government.

I have, &c.

CALCUTTA, *(Signed)* C. PATON, *Lieutenant.*

15th November, 1822. *A. S. P. B.*

The following Statement was received from* LIEUTENANT *W.* BURLTON, *Sub-Assistant Commissary General. Nov. 18th. 1822.

No. II *u.*

Statement of hire of River Boats for the periods specified of 4 and 2½ days respectively, according to the established Rates now in use. No. 11.

	Diamond Harbour hire for 2½ days.	New Anchorage hire for 4 days.	Number of men calculated to carry	Expense per man for 2½ days.	Expense per man for 4 days.
	Rs. As. P.	Rs. As. P		Rs. As. P	Rs. As. P.
Boat of 500 Maunds,	2 6 6	3 13 7	6 Men,	0 6 5	0 10 $3\frac{1}{6}$
„ 500 „	3 5 2	5 5 1	10 Men.	0 5 $3\frac{1}{5}$	0 6 $10\frac{6}{10}$
„ 700 „	4 3 10	6 12 8	11 Men.	0 4 10^{1}	0 7 9 1/[illegible]

COMMISSARIAT EXECUTIVE OFFICE, (*Signed*) WILLIAM BURLTON, *Lieut.*
FORT WILLIAM, *S. A. C. G.*
November 18, 1822.

The following Estimate of time taken up in the passage by the proposed Canal was received from* LIEUTENANT *J. A.* SCHALCH, *Deputy Assistant Quarter-Master General. Nov. 20th 1822.

No. II *uu.*

ESTIMATE

The following calculations are for Laden Boats, Passage Boats will of course perform the trip in a shorter space of time. Nov. 19th 1822

N. E. MONSOON

	Hours.	Return in Hours.
A Boat leaving Colvin's Ghaut half an hour before the tide comes up will reach Russapugly in	2	0
A Boat leaving Russapugly an hour and a half before the tide makes, will reach Colvin's Ghaut in	6	2
From Russapugly to Diamond Harbour, ...	7	10
„ „ . to Rangafulla, ...	11	15
„ „ .. Channel Creek, ...	13	17
„ „ „ New Anchorage via the Bogwakally and Dog Creek, ...	23	31

Nov. 20th 1822

S. W. MONSOON.

		Return in
	Hours.	Hours.
From Colvin's Ghaut to Russapugly under the same circumstances as stated above, ...	2	2
From Russapugly to Diamond Harbour, ...	10	6
,, ,, to Rungafulla, ...	16	8
,, ,, to Channel Creek, ...	18	10
,, ,, to New Anchorage, via Bugwakally and Dog Creek, ...	26	16

(*Signed*) J. AUG. SCHALCH,
D. A. Quarter-Master General.

20th November, 1822

Nov 26th 1822

The following Letter was received from the Acting Salt Agent Western Division of the 24-Pergunnahs.

No. II. *v.*

No 16.

To CAPTAIN R. C. FAITHFULL,

Secretary to the Special Committee Lieut. Schalch's Plans, Fort William.

SIR,

I have the honor to acknowledge the receipt of your Letter and of its enclosure, under date the 28th ultimo, requesting on the part of the Committee appointed by Government, to report on a Plan submitted by Lieutenant Schalch for opening a Canal between Calcutta and Channel Creek, my sentiments on the certain Queries therein proposed, and also on any other point connected with the general object of the Plan, as it may be in my power to afford information.

2. I have herewith the honor to subjoin my Answer to the Queries proposed by the Committee.

1st. The Canal proposed to be carried from Tolly's Nullah at Russapugly to Saugor, together with the two Canals of communication with the Hooghly River, one to join it at Diamond Harbour, and the other at Rangafulla, are in my opinion likely to prove extremely advantageous to the Country Trade during the unfavorable Monsoon, in as much as all the dangers that are experienced in the Hooghly River in that Season, by violent winds, storms, and other accidents will be avoided. The difficulties which are at present experienced in the employment of Country Craft or Boats, between Calcutta and Diamond Harbour and Channel Creek, as far as my local experience and information goes, arise from the risk and delay of their Navigation in the Hooghly River at the above Season, very few Boats excepting those of large burthen, such as some of those which are employed in the conveyance of Salt from Hidgelly and Tumlook, venturing so far down at this Season, scarcely any rate of hire compensating for the risk of total loss of the Boats so employed.

2ndly. I cannot speak as to the probable extent of the Country Trade which would pass through the Canal, not knowing what the precise extent of the Country Trade is; but I should think unquestionably, that nearly the whole, if not the whole, of the Trade which

is either in the vicinage of the Canal, or which has hitherto from necessity passed through the great River, would avail itself of this New Channel of communication with Calcutta; and in describing the extent of this Trade I should comprehend in it the whole of the Trade of the 24-Pergunnahs laying to the Southward of Tolly's Nullah and Calcutta, together with some portion of the Salt of the produce of the Hidgelly and Tumlook Agencies, and also of Saugor, and other articles of the latter district, and at least one Lack of maunds of Salt of the produce of the 24-Pergunnahs Salt Agency, all the Firewood, Charcoal, and Chunam made in the Sunderbunds contiguous to Saugor, would of course give a preference to this New Channel of communication, independent of the increase of commerce in these articles, which this facility of transportation would probably give rise to. Nov. 26th.

3rdly. Between the months of October and February, Boats laden, not exceeding 500 maunds Burthen, are occupied usually not less than 3 days in travelling from Rangafulla to Calcutta; the rate of hire paid is from 7-8 to 8½ Rupees per hundred maunds. From the month of March to September, which is the unfavorable Season, Boats of the same description very seldom navigate from Saugor to Calcutta. In this Season from Rangafulla and its neighbourhood, Boats are occupied 4 or 5 days in travelling to Calcutta in intervals of moderate weather, but if the wind blows hard, they are obliged to run into some Creek, and their progress up the River is rendered difficult and quite uncertain; the rate of hire in this Season is 10½ Rupees per maund from Rangafulla and Culpee to Calcutta. If no Creeks are immediately available for Shelter, many Boats are frequently lost. In the fair weather, Boats of the above description take four or five days travelling from Saugor to Calcutta, though the present route and the rate of hire is 12 Rupees per hundred maunds.

4thly. Not more than 8,000 maunds of the Salt manufactured in this Agency has to traverse the River Hooghly antecedent to its sale; and during these three years I have had charge of this Agency, no loss has been sustained by Government in the transit of Salt to the Company's Golahs through the route in question. After the Salt is delivered to the Merchants, a quantity of not less than one Lack of maunds proceeds annually by the present route of the great River, and I have heard of Boats laden with Salt having been lost, but as I possess no accurate account of losses which Merchants themselves sustain in the article after it has been delivered to them, I am not able to state what proportion such losses bear to the total amount of Salt proceeding from this Agency to Calcutta or its vicinity, by the route in question.

3rd. From the general tenor of the foregoing observations, the Committee will collect, that in my opinion great benefit will accrue both to the Internal Commerce of the District, and the General Commerce by Sea from the construction of the Canal contemplated. I had certainly at one time some doubts, (so far as the Salt manufacture is concerned,) as to whether the opening of this Canal might not facilitate a smuggling of the article from my remote Pergunnahs, hitherto somewhat protected from illicit practice, but these I conceive could be easily obviated by proper checks; while, on the other hand, it is not improbable, that the construction of the Canal may on the whole increase the number of Calaries in that neighbourhood

I am, &c.

(Signed) R. C. PLOWDEN,
Acting Salt Agent.

BARRIPORE SALT OFFICE,
The 20th November, 1822.

Dec. 3rd. 1822.

The following Letter and Statement was received from the Secretary to the Board of Trade.

No. II. *w.*

No. 283.

No. 17

To CAPTAIN R. C. FAITHFULL,

Secretary, Special Committee Lieut. Schalch's Plans.

SIR,

Board of Trade. I am directed by the Board of Trade to acknowledge the receipt of your Letter under date the 28th ultimo, with its enclosures.

2. It having been necessary to refer to the Export and Import Warehouse-keepers for the information required by the Committee, I am now directed to transmit for their information, the annexed copies of the Replies which have been received from these Officers, dated the 15th and 22nd instant.

I am, &c.

FORT WILLIAM, *(Signed)* W. NISBET,

The 29th Nov. 1822. *Secretary.*

No. II. *w.* (1)

No. 18.

To GEORGE UDNY, ESQ.

Acting President, and Members of the Board of Trade.

GENTLEMEN,

Import Warehouse. I have the honor to acknowledge the receipt of your Secretary's Letter, dated the 1st instant with its enclosures, and in reply, to transmit for your information, the accompanying Statements, descriptive of the annual average Number, Description, and Tonnage of the River Craft employed in the loading and unloading of the Honorable Company's Ships at, or below Diamond Harbour, and the cost per Maund or Ton incurred in the conveyance of the Cargoes.

2. The above Statements embrace a period of 9 years, commencing with the Season 1813-14, and I think 14 days may be assumed as the ordinary period that a Sloop takes to perform the voyage to and from the New Anchorage, and 8 in the case of Diamond Harbour.

3. A Statement of the losses incurred upon the River, during a corresponding period also accompanies this address, and I am of opinion, that they might have all been averted, had the proposed Canal existed at the time the losses severally occurred.

4. The route by the Canal would certainly afford additional security to Vessels navigating between Calcutta and Saugor, and I should think it would reduce the present charges about one-fourth; but much must depend upon their experiencing none of the detention they are so liable to in Tolly's Nullah, and many of the small Rivers in Bengal.

I have the honor to be, &c.

FORT WILLIAM, *(Signed)* J. TROTTER,

The 15th Nov. 1822. *Import W. H. K.*

No. II.

Dec. 3rd, 1822. No. 19.

Statement exhibiting the particulars of Freight of Sloops, employed in the transport of Import Consignments for the following Seasons.

Names of Ships.	Tonnage of Ships.	Tonnage of Sloops.	Discharged at Kidderpore.	Discharged at Moyapore.	Discharged at Diamond Harbour.	Discharged at Kedgeree.	Discharged at Saugor.	Total.
		Tns. Cwt. Qr lb.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.
1813-14.								
Marquis of Wellington,	961	...	...	...	923 10 1	...	0 0 0	923 10 1
Metcalfe,	...	...	...	...	443 1 9	...	0 0 0	443 1 9
Baring,...	...	..	...	...	406 13 0	...	0 0 0	406 13 0
Hugh Inglis,	820	...	...	...	504 2 0	...	0 0 0	504 2 0
Lord Melville, ...	819	...	...	...	353 0 3	...	0 0 0	353 0 0
Prince Regent,	953	...	...	...	96 1 6	...	0 0 0	96 1 6
Lady Lushington,	594	...	...	..	62 8 0	...	0 0 0	62 8 0
Streatham, ...	819	...	...	...	0 0 0	...	1,085 0 0	1,085 0 0
Carnatic,	820	...	...	...	0 0 0	...	822 6 6	822 6 6
Devonshire, ...	820	...	..	...	0 0 0	...	1,116 4 0	1,116 4 0
Northumberland,	600	...	...	...	40 3 6	...	0 0 0	40 3 6
William Pitt,	819	...	...	...	0 0 0	...	423 1 0	423 1 0
Minerva,	976	...	...	...	110 1 0	...	0 0 0	110 1 0
Marchioness of Exeter,	820	..	...	...	0 0 0	...	320 15 6	320 15 6
Troubridge, (from Java,)	...	...	...	...	0 0 0	...	393 4 0	393 4 0
Moffat,	776	...	...	...	8 11 3	...	0 0 0	8 11 3
	[10,597]	...	...	...	2,948 4 4	...	4,160 15 0	7,109 3 1

Dec. 3rd.
1822.
No. 19.

No. II. w.[1a]—(Continued.)

Statement exhibiting the particulars of Freight of Sloops, employed in the transport of Import Consignments for the following Seasons.

Names of Ships.	Tonnage of Ships.	Tonnage of Sloops.	Discharged at: Kidderpore.	Discharged at: Moyapore.	Discharged at: Diamond Harbour	Discharged at: Kedgeree.	Discharged at: Saugor.	Total.
1814-15.		Tns. Cwt. Qr. lbs.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.
Asia, ...	958	268 16 0 13	...	...	378 2 1	...	0 0 0	378 2 1
Europe, ...	820	200 6 2 0	...	...	589 9 0	...	0 0 0	589 9 0
Astell, ...	820	153 2 2 0	...	...	674 1 11	...	0 0 0	674 1 11
Surrey, ...	819	255 12 2 1	...	...	0 0 0	...	1,839 10 9	1,839 10 9
Bengal, ...	955	309 9 0 16	...	...	0 0 0	...	1,501 12 6	1,501 12 6
Lord Keith, ...	599	283 14 0 20	...	...	326 7 0	...	95 7 0	421 14 0
Alexander, ...	600	278 10 0 10	...	...	510 12 3	...	0 0 0	510 12 3
Marchioness of Ely, ...	952	72 19 0 27	...	...	0 0 0	...	298 7 0	298 7 0
Ann, ...	508	185 12 3 20	...	...	705 12 3	...	0 0 0	705 12 3
Phœnix, ...	818	332 10 0 14	...	...	0 0 0	...	815 1 6	815 1 6
Prince Regent, ...	953	285 7 3 21	...	...	0 0 0	...	970 14 5	970 14 5
Warren Hastings, ...	1,000	521 0 1 16	...	...	0 0 0	...	1,786 3 3	1,786 3 3
Lady Castlereagh, ...	820	417 5 3 22	...	...	0 0 0	...	1,599 4 9	1,599 4 9
Coldstream, ...	693	274 13 1 8	...	...	779 0 1	...	0 0 0	779 0 1
Royal George, ...	1,200	340 17 3 1	...	...	0 0 0	...	1,246 3 6	1,246 3 6
Cuffnells, ...	1,200	508 7 0 25	...	...	0 0 0	...	1,406 7 0	1,406 7 0
	[73,715]	4,688 5 3 18	...	...	3,963 12 7	...	11,559 7 8	15,523 4 3

Dec. 3rd. 1822.

No. II w.(a)—(*Continued.*)

Statement exhibiting the particulars of Freight of Sloops, employed in the transport of Import consignments for the following Seasons.

Names of Ships.	Tonnage of Ships	Tonnage of Sloops.	Discharged at Kidderpore	Discharged at Moyapore.	Discharged at Diamond Harbour.	Discharged at Kedgeree.	Discharged at Saugor.	Total.
	Tons.	Tns. Cwt. Qr. lb.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.
1815-16.								
Princess Charlotte of Wales, ...	976	172 15 2 1	..	..	808 5 8	..	..	808 5 8
William Pitt, ...	819	236 1 1 7	..	..	531 15 8	.	..	531 15 8
Marquis of Wellington, ...	961	248 10 1 10	..	..	435 2 0	..	..	435 2 0
Apollo, ...	652	392 2 1 7	140 0 0	..	426 15 1	..	..	466 15 1
Lord Melville, ...	819	153 12 2 13	...	..	355 7 11	..	..	355 7 11
Metcalfe, ...	...	123 16 0 8	..	..	307 14 2	..	..	307 14 2
Minerva	976	443 10 0 11	..	..	510 4 1	..	..	510 4 1
Baring, (from New South Wales.)	...	...	..	..	.. 0 0	...	125 0 0	125 0 0
Union, ...	550	21 10 1 14	..	..	88 1 0	..	..	88 1 0
Carnatic, ...	820	361 4 3 15	..	..	.. 0 0	..	1,587 15 6	1,587 15 6
James Sibbald, ...	647	305 10 2 7	..	..	1,107 8 2	..	..	1,107 8 2
Lord Castlereagh, ...	...	376 7 1 20	..	..	1,191 4 3	..	..	1,191 4 3
Fairlie, ...	695	313 17 1 4	.	..	...	..	1,716 0 10	1,716 0 10
	[7,918]	3,153 18 3 5	140 0 0	..	* 5,662 14 0	..	3,429 0 4	9,231 14 4
1816-17.								
Warren Hastings, ...	1,000	386 5 1 25	..	..	..	...	1,556 13 5	1,556 13 5
Phœnix, ...	818	233 0 2 18	..	..	225 0 0	228 0 0	..	453 0 0
Marchioness of Ely, ...	950	510 7 1 22	..	..	..	..	1,438 8 5	1,438 8 5
Lord Keith, ...	599	303 1 0 10	..	..	81 15 4	310 0 0	..	391 15 4
Asia, ...	958	377 15 3 1	..	..	..	..	1,505 10 11	1,505 10 11
Prince Regent, ...	953	238 2 0 24	..	..	..	...	735 12 2	735 12 2
Astell, ...	820	307 16 2 10	..	..	..	..	834 3 4	834 3 4
Lady Campbell	681	504 18 1 22	..	180 0 0	482 0 11	..	..	662 0 11
Mangies.	560	422 13 3 0	..	...	..	...	178 12 0	178 12 0
	[7,339]	†3,294 1 1 20	...	180 0 0	789 0 3	538 0 0	6,249 12 3	7,756 12 6

* Qy. 5,762 14 0 J. M.

† Qy. 3,284 1 1 20 J. M.

No. II w.[1a]—(Continued.)

Dec 3rd. 1822.

Statement exhibiting the particulars of Freight of Sloops, employed in the transport of Import consignments for the following Seasons.

Names of Ships.	Tonnage of Ships.	Tonnage of Sloops.	Discharged at Kidderpore.	Discharged at Moyapore.	Discharged at Diamond Harbour.	Discharged at Kedgeree.	Discharged at Saugor.	Total.
	Tons.	Tns. Cwt. Qr. lb.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.
1817-18.								
Lord Melville,	..	.. ..	..	..	..	..	322 8 0	322 8 0
General Kyd,	1,200	355 19 1 20	..	..	..	..	1,213 1 2	1,213 1 2
Atlas,	1,200	354 5 3 25	..	..	..	..	1,261 3 0	1,261 3 0
Marquis of Wellington,	961	395 14 2 4	..	..	..	..	1,466 9 7	1,466 9 7
Minerva,	976	402 12 0 14	..	..	..	..	1,308 5 11	1,308 5 11
Streatham,	819	462 0 1 11	..	..	..	..	1,843 11 6	1,843 11 6
Rose,	955	517 10 2 19	..	..	..	..	1,835 4 10	1,835 4 10
Princess Charlotte of Wales,	976	488 3 2 7	..	..	..	..	16,50 12 2	1,650 12 2
Carnatic,	820	486 6 1 0	..	..	519 0 11	..	.. .. ..	519 0 11
William Pitt,	819	451 19 2 0	..	..	832 15 10	..	.. .. ..	832 15 10
Lord Castlereagh,	..	312 18 0 17	..	..	1,060 3 3	..	.. .. ..	1,060 3 3
Northumberland,	600	367 16 3 11	..	..	812 8 3	..	.. .. ..	812 8 3
Thomas Grenville,	886	306 8 1 14	..	..	973 15 11	..	.. .. ..	973 15 11
Union,	550	270 17 2 2	..	..	345 2 5	..	.. .. ..	345 2 5
	[10,762]	5,252 13 1 4	..	..	4,543 14 7	..	10,901 8 2	15,445 6 9

No. II w[131]—(Continued.)

Dec. 3rd. 1822. ***Statement** exhibiting the particulars of Freight of Sloops, employed in the tranport of Import consignments for the following Seasons.*

Names of Ships.	Tonnage of Ships.	Tonnage of Sloops.	Discharged at Kidderpore.	Discharged at Moyapore.	Discharged at Diamond Harbour.	Discharged at Kedgeree.	Discharged at Saugor.	Total.
	Tons.	Tons. Cwt. Qr. lb.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.	Sa. Rs. As. P.
1818-19.								
Dunira, ...	1,325	458 0 2 6	..	..	..	..	2,600 5 4	2,600 5 4
Castle Huntly, ...	1,200	411 19 3 3	..	..	..	..	2,196 7 8	2,196 7 8
Henry Porcher, ...	465	309 4 3 15	60	..	..	..	..	60 0 0
Marchioness of Ely, ...	952	200 6 1 9	..	..	..	..	496 14 6	496 14 6
Prince Regent, ...	953	199 19 1 17	..	..	..	..	497 5 10	497 5 10
Fairlie, ...	698	335 4 3 5	..	..	436 2 8	..	..	436 2 8
Astell, ...	820	307 15 2 21	..	..	804 10 4	..	..	804 10 4
Phœnix, ...	818	314 16 1 24	..	..	733 7 10	..	..	733 7 10
Asia, ...	958	232 3 0 4	..	..	..	..	767 7 9	767 7 9
Warren Hastings, ...	1,000	204 8 3 27	..	..	..	..	1,060 12 5	1,060 12 5
General Hewit, ...	894	233 10 3 23	..	..	..	..	618 12 1	618 12 1
	[10,083]	3,237 10 3 14	60	..	1,974 4 10	..	8,238 1 7	10,272 6 5
1819-20.								
Waterloo, ...	1,325	489 15 2 14	..	..	..	..	1,785 0 6	1,785 0 6
Atlas, ...	1,200	363 17 3 19	..	..	..	..	1,148 2 3	1,148 2 3
Streatham, ...	819	205 16 0 2	..	..	673 5 1	..	..	673 5 1
Rose, ...	955	213 15 2 1	..	..	..	..	636 2 7	636 2 7
Minerva, ...	976	209 4 1 6	..	..	..	..	523 7 8	523 7 8
Carnatic, ...	820	310 10 0 26	..	..	236 15 3	..	685 6 1	922 5 4
Thomas Grenville, ...	886	337 1 0 10	..	..	46 14 10	..	1,214 6 2	1,261 5 0
Princess Charlotte of Wales, ...	976	447 1 2 4	..	..	..	..	1,562 6 10	1,562 6 10
Marquis of Wellington.	961	424 3 3 4	..	..	..	..	1,677 2 5	1,677 2 5
	[8,918]	3,001 6 0 2	..	.	957 3 2	..	9,232 2 6	10,189 5 8

Dec. 3rd [illegible]
1822

No. II w (1a)—(*Continued.*)

Statement exhibiting the particulars of Freight of Sloops employed in the transport of Import consignments for the following Seasons.

Names of Ships.	Tonnage of Ships.	Tonnage of Sloops.	Discharged at Kidderpore.	Discharged at Moyapore.	Discharged at Diamond Harbour.	Discharged at Kedgeree.	Discharged at Saugor.	Total.
	Tonnage.	Tns. Cwt. Qr. lb.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.	Sa. RS. AS. P.
1820-21.								
Castle Huntly, ...	1,200	477 5 1 2	..	..	..	..	1,494 14 9	1,494 14 9
Astell, ...	820	330 3 1 18	..	..	..	..	869 3 1	869 3 1
Asia, ...	958	390 14 3 2	..	..	..	..	1,089 6 11	1,089 6 11
David Scott, transhipped from the H. C. S. Coromandel at Fort St. George,*	..	309 0 0 0	..	..	144 5 0	..	..	144 5 0
Coldstream, ...	733	200 0 0 0	..	..	248 2 0	..	..	248 2 0
	[3,711]	1707 3 1 22	..	..	392 7 0	..	3,453 8 9	3,845 15 9
1821-22.								
Atlas, ...	1,200	409 11 3 2	..	..	..	..	1,444 4 1	1,441 4 1
Lowther Castle, ...	1,200	493 2 3 21	..	..	..	..	1,981 10 5	1,981 10 5
General Kyd, ...	1,200	465 13 1 4	..	..	..	..	1,844 15 2	1,844 15 2
Princess Charlotte of Wales, ..	976	418 3 3 17	..	..	..	..	1,046 2 9	1,046 2 9
Marquis of Wellington, ...	961	106 0 0 12	..	..	..	..	597 9 11	597 9 11
Barrosa, ...	..	413 2 1 12	..	..	103 3 7	..	..	103 3 7
Thomas Grenville, ...	886	113 0 1 20	..	..	..	..	649 1 2	649 1 2
Rose, ...	955	398 12 0 4	..	..	..	..	992 0 2	992 0 2
	[7,378]	2817 6 3 8	..	..	103 3 7	..	8,555 11 8	*8,658 15 3

*Qy 8,555 15 3
J. M.

FORT WILLIAM, IMPORT WAREHOUSE,
The 15th November, 1822.

(*Signed*) J. TROTTER,
Import Warehouse-keeper.

No. II. *w.*(16)

Dec 3rd 1822.

Statement exhibiting the gross Freight of Sloops employed in the transport of Import consignments for the following Seasons. No. 20

In 1813-14, ...	7,109	3	4
14-15, ...	15,523	4	3
15-16, ...	9,231	11	4
16-17, ...	7,756	12	6
17-18, ...	15,445	6	9
18-19, ...	10,272	6	5
19-20, ...	10,189	5	8
20-21, ...	3,845	15	9
21-22, ...	8,658	15	3
Total Freight, Sicca Rupees	88,033	4	3

Fort William, Import Warehouse,
The 15th November 1822.

(*Signed*) J. TROTTER,
Import Warehouse-keeper.

No. II. *w.*(17)

Import Consignments from London. No. 21

Import Consignments from London.	Commercial			Political.			Total.		
	Sa. RS.	AS.	P.	Sa. RS.	AS.	P.	Sa. RS.	AS.	P.
In the Indian Season. 1813-14..	31,92,604	6	8	7,91,069	2	9	39,83,673	9	5
14-15...	39,35,235	10	1	8,60,982	9	6	47,96,218	3	7
15-16...	30,41,838	3	1	13,79,689	9	4	44,21,527	12	5
16-17..	16,64,131	11	5	14,23,375	2	11	30,87,506	14	4
17-18..	22,01,528	10	2	18,26,293	13	2	40,27,822	7	1
18-19...	13,82,497	3	6	14,24,065	8	3	28,06,562	11	9
19-20...	20,51,820	13	5	15,16,414	0	8	35,71,234	14	1
20-21..	26,63,594	3	7	12,48,613	11	6	39,12,207	15	1
21-22..	26,29,228	3	7	6,03,373	5	7	32,32,601	9	2
	2,27,65,479	1	6	1,10,73,876	15	8	3,38,39,356	1	2

Fort William, Import Warehouse,
The 15th November, 1822.

(*Signed*) J. TROTTER,
Import Warehouse-keeper.

Dec 3d 1822

No. 72

No. II. w.[1d]

On Export Goods.

	Diamond Harbour.			Kedgeree.			Saugor or New Anchorage.		
Saltpetre and Sugar of two F. mds each bag, ...	0	2	0	0	2	6	0	3	6
Cloth, Silk, Cotton, Gunny, Jute, Sunn or Hemp, large and small bales each,	0	7	0	0	10	0	1	0	0
Chest, Box, or Case each, ...	0	5	0	0	7	0	0	11	0
Madeira in Pipes for each, ...	1	0	0	1	8	0	2	0	0
Rum, Spice and Ghee, large and small Casks each, ...	1	6	0	2	0	0	2	12	0
Weighable Goods per F. mds.	0	1	0	0	1	6	0	2	0

Return Freight of the Goods above detailed articles to pay one-half of the above Rates.

On Import Goods.

	Diamond Harbour. Full Freight.			Diamond Harbour Return Freight.			Kedgeree Full Freight.			Kedgeree Return Freight.			Saugor or New Anchorage, Full Freight.			Saugor or New Anchorage Return Freight.		
Cloth and Canvas per each Bale, ...	0	7	0	0	5	0	0	8	0	0	6	0	0	15	0	0	10	0
Chest Box or Cases each. ..	0	5	0	0	4	0	0	7	0	0	5	0	0	11	0	0	8	0
Large Guns and Anchors each,	0	7	0	0	5	0	0	10	0	0	7	0	0	14	0	0	10	0
Small do. not exceeding 5 cwt.	0	5	0	0	3	9	0	7	0	0	4	0	0	10	0	0	7	0
Gun Flints per Cask, ..	0	6	0	0	4	0	0	7	0	0	5	0	0	12	0	0	8	0
Braziery per Case, ...	0	1	0	0	3	0	0	5	0	0	4	0	0	8	0	0	6	0
Iron, Lead, Copper, Steel and Tin &c. at per cent.	0	1	6	0	1	0	0	2	3	0	1	6	0	3	0	0	2	0
Madeira in Pipes and Hdhs. each, ...	1	0	0	0	10	0	1	8	0	1	0	0	2	0	0	1	4	0
Brandy and Rum per Cask, ..	1	6	0	1	0	0	2	0	0	1	6	0	2	12	0	2	0	0
Linseed, Turpentine, Varnish, per Jar, ...	0	4	0	0	3	0	0	5	0	0	4	0	0	8	0	0	6	0
Tar and Pitch per Barrel ..	0	9	0	0	7	0	0	11	0	0	9	0	1	2	0	0	12	0
Ironmongery, Paints, per Cask.	0	6	0	0	4	0	0	9	0	0	7	0	0	12	0	0	8	0
Cordage per cwt.	0	1	6	0	1	0	0	2	3	0	1	6	0	3	0	0	2	0

In the event of Sloops being detained with the Ship's Demurrage, to be paid one Sicca Rupee per day per 100 bags on the burthen of the Sloops.

FORT WILLIAM IMPORT WAREHOUSE,
The 15th November, 1822

(Signed) J. TROTTER,
Import W. H. K.

No. II. *w.*(1)

Dec. 3rd. 1822.

No. 23.

Statement exhibiting the Losses sustained in the transit of Goods, from the Stations below to Calcutta, in the Sinking of Sloops in the undermentioned Seasons.

In 1819-20. From the Honorable Company's Ship Marquis of Wellington.
The large Sloop Triton, ... Sa. Rs. 19,001 1 9

" 1821-22. From the Honorable Company's Ship Atlas,
The Sloop Nancy, ... 31,991 9 2

FORT WILLIAM, IMPORT WAREHOUSE,
The 15th November, 1822.

(Signed) J. TROTTER,
Import W. H. K.

No. II. *w.*(2)

No. 24

To GEORGE UDNY, ESQ
Export Warehouse-keeper.

SIR,

I beg leave to acknowledge the receipt of Mr. Secretary Nisbet's Letter, dated the 1st instant, forwarding Copy of a letter from the Secretary to the Special Committee on "Lieutenant Schalch's Plans," and desiring a report on the several points on which information is required, as far as relates to this particular Department.

2nd A Statement shewing the Tonnage and amount of Sloop Hire incurred in transporting Cargo to Ships at Diamond Harbour, Kedgeree, New Anchorage, and Saugor, during the last five years is hereto annexed. The cost of conveyance would appear to average about Sa. Rs 4 : 3 : 8 per Ton.

3rd. No loss on Goods in transit from this Department has been sustained during the past five years. In the present Season three Sloops were stranded below at Kedgeree, and by which property to the extent of Sa. Rs. 38,000 was considerably damaged

4th. The Board are aware that until within the last year, Craft was furnished to this Department under a contract with Rammohun Dutt, a list of whose Sloops, together with their several capacities is already in the possession of the Board.

5th. The time usually occupied in the transport of Cargoes has been calculated as under ; viz.

From the Months of October to February.	*Days.*	*From the Months of March to September.*	*Days.*
To Diamond Harbour, ...	2	To Diamond Harbour, ...	5
Kedgeree,...	3	Kedgeree,...	7
New Anchorage and Saugor, ...	4	New Anchorage and Saugor, ...	9

6th. The Records of this Office do not enable me to furnish information upon the other points adverted to by Captain Faithfull.

I am, &c

EXPORT WAREHOUSE,
The 22nd November, 1822

(Signed) F. MACNAGHTEN.
Offg. S. E. W. H. K.

Dec. 3rd. 1822.

No. II. w (2a)

No. 25. *Statement shewing the Tonnage and amount of Sloop Hire incurred at the Export Warehouse, for the last five years, ending the 30th April 1822, for the conveyance of the Honorable Company's Cargoes to Ships at Diamond Harbour, Kedgeree, and Saugor.*

	Tonnage. Tons.	Cwt.	Amount. Sa. Rs.	As.	P.
1817-18,	8,119	4	31,511	3	7
1818-19,	6,211	13	24,689	3	8
1819-20,	7,935	0	31,043	7	2
1820-21,	7,208	13	34,585	3	10
1821-22,	5,868	10	27,810	6	6
	35,393	0	1,49,639	8	9

or Sa. Rs. 4 . 3 . 8 per Ton

EXPORT WAREHOUSE,
23rd November, 1822.

Errors Excepted.

(Signed) F. MACNAGHTEN,
Offg. S. E. W. H. K.

(True Copies.)

(Signed) W. NISBET
Secretary.

Dec. 13th 1822. *The following Letter was received from the Secretary to the Committee of Management Saugor Island Society.*

No. II. x.

To CAPTAIN R. C. FAITHFULL,

No. 26. *Secretary to the Special Committee appointed by Government to Report on Lieut. Schalch's Plan of a Canal from Calcutta to Channel Creek.*

SIR,

I have the honor to acknowledge the receipt of your Letter, dated the 28th October, with the Abstract of Lieutenant Schalch's Plan therewith transmitted; and in reply to the Queries therein submitted, I am authorized to offer the following particulars of information on the part of the Saugor Island Society :—

Query 1st. The projected Canal is likely to be of great public advantage, by providing what is much wanted, a safe and expeditious communication between Calcutta and the Island and Roadsteads of Saugor and its vicinity, during the unfavorable Monsoon ; it will

be seen, on an inspection of the Map of the Hooghly, that the *Embouchure* of the River below Diamond Harbour widens out into a perfect Frith, which lays it open to the whole force of the South-West wind, causing it thereby to become a serious cause of obstruction to vessels proceeding with Cargo to Kedgeree or Saugor during that period. The difficulty of the passage is in fact so great, that none but the best appointed vessels can effect it, and the expense attending their employment is of course enhanced in proportion; whereas under the lee of Saugor and through the Baugnah Kallee, the smallest boats can ply in the worst weather with safety and dispatch. By the formation of the Canal, it is obvious, that the whole line of communication to the New Anchorage would be rendered navigable with ease and expedition, in still water, under every circumstance of weather. Of the advantages thus obtainable, the following instance of difficult passage may serve for illustration. During the last blowing Monsoon, an Officer of H. M. Ship Curlew, lying at the New Anchorage, borrowed a Bholiah from the Master Attendant, to convey him to his Ship; when he reached Mud Point the wind freshened so much, that the boat could proceed no further in the usual direction, but the Mangy fortunately knowing the passages, pushed into Channel Creek, went through the Baugnah Kallee, and put the Officer on board his Ship, in such weather, as would have prevented any vessel whatever from making the passage by the direct course of the River via Kedgeree. When on board the H. C. Ship Earl of Balcarras at the New Anchorage in July last, and mentioning this circumstance, I was informed by the Officers of that Ship, that it had now become a common practice for all the boats bound to the New Anchorage from Calcutta, to take the route pursued by the Bholiah, during the prevalence of blowing weather. Dec. 13th. 1822

Query 2nd. The whole of the trade from the Eastward chiefly in the articles of Rice and Chunam, conveyed in larger boats through the lower Sunderbund passage, *via* the Doagara and Channel Creek to Calcutta, would pass through the Canal in preference to using the Hooghly The difficulty, danger, and tediousness of progress experienced in going down the River, would be thus obviated, and also the danger of coming up during Westerly and South-westerly winds, when the whole of Diamond Harbour Reach is a lee shore, and no Country Boat is able to pass it safely in blowing weather, so that unless they get into Chingery Creek, or Diamond Harbour Creek, for shelter, they are sure to be wrecked. From this circumstance the annual loss of boats at that part of the River is very considerable.

A very large proportion of the Firewood and Charcoal required for the consumption of Calcutta; all the Salt manufactured in the neighbourhood of Channel Creek, and the Subtermookee; and all the Salt, Charcoal, and Chunam manufactured, and Rice grown, on Saugor Island, would also pass through the Canal. The whole of the Salt and Grain from Hidgellee and Kedgeree would pass through it in the months of March, April, May, and June. And it is also particularly deserving of attention, that the very highly cultivated Rice Country through which the Canal will pass to the extent of 40 miles, will, from its proximity to the Capital, become daily more valuable, in consequence of the extension which the facility of Water-carriage will give to the manufactories of Bricks, Tiles, and coarse Articles, and the consequent increase of population.

Query 3rd. The time taken up in each month of the year in the passage from Calcutta to Saugor, and back again, and the expense of boat hire for that purpose, may be stated as follows:—

Dec. 13th. 1822.

A TABLE

Shewing the number of Days required by Sloops and Bhurs to perform a trip from Calcutta to Diamond Harbour, Kedgeree, and Saugor, and back, together with the expense during the several Seasons of the year.

	Sloops	Per Trip Days.	Expense.	Bhu	Per Trip Days	Expense.
			AS. P.			RS.
From October, to February.	To Diamond Harb		at 1 9 per bag of 2 mds	To Diamond Harb		at 16 per Trip.
	,, Kedgeree.	10	at 2 3 ditto ditto,	,, Kedgeree.	10	at 24 ditto
	,, Saugor.	15	at 3 3 ditto ditto.	,, Saugor	12	at 32 ditto.
From March, to September.	,, Diamond Harb.		at 2 0 ditto do	,, Cannot Navigate during this period of the year.		
	,, Kedgeree.	10	at 3 0 ditto do			
	,, Saugor.	15	at 4 0 ditto do			

Query 4th. The opening of the Canal will most materially facilitate the clearing and subsequent improvement of Saugor Island. Increased facility of communication between distant places, attended with a diminution of Expense, being equivalent to a reduction of distance. It is needless to enter into an illustration of the eminent degree in which the Island of Saugor would participate in the advantages above enumerated, as likely to result from the construction of the Canal.

Query 5th During the clearing of Saugor Island its Exports to Calcutta will be chiefly Charcoal and Firewood, to an extent which cannot at present be easily estimated, but which will be of course affected by the facilities afforded by the Canal. When the Island is cleared and under cultivation, its produce in Rice, Sugar, Cotton, and Coffee will be very considerable. The Salt manufactured on it will amount to ten lacks of maunds per annum, and when it becomes peopled, the use of the Canal from the thoroughfare of passengers, and the trade of produce up, and of manufactured articles, and necessaries down, will be very great, especially when the Docks, which it is in contemplation to form, are completed, and a considerable European community is established on the Island.

Having thus replied to the Queries of the Committee, communicated in your Letter, it is almost unnecessary to state, that the Saugor Island Society approves most highly of the Plan which has for its object, the accomplishment of a purpose so very desirable, and so highly important. The intended line of the Canal and its two branches of communication with the River appear to be admirably fitted for the ends proposed, but it is to be regretted that a third branch of communication (which would indeed be the first in importance and benefit) has not been Planned to join the River at the bottom of Garden Reach. As Lock Gates are to be employed to retain water sufficient for the passage of large boats in the Canal during every period of the Tide, and as the projected branches of communication with the River will be clear and unobstructed, it certainly appears inconsistent with the importance of the object proposed, that the City end of the Canal, which from the extension of Villages along its banks must necessarily be the most crowded, should communicate only with the River by Tolly's Nullah, a passage so notoriously obstructed, from shallowness of water, want of breadth, number of bridges, and masses of Boats, that all thoroughfare is in the Dry Season nearly suspended.

Tolly's Nullah, already much too small to vent the number of Boats which resort to it, and which keep increasing yearly with the increase of the City, requires to be quadrupled in size to relieve the trade struggling by main force to get through it, instead of being blocked up by rendering it also the Channel of ingress and egress for the Boats of the Canal; indeed if it were to be reserved for their exclusive use, it would be evidently inadequate to afford expeditious or free passage to the number of Boats, which may be expected to enter or leave the Canal at the City end, especially as all the Bridges would have to be passed, and in the Dry Season, the bottom is dry during a great part of the Tide under Kidderpore Bridge. The accession, however, of these Boats to the present Trade in the Nullah, would destroy the practicability of its being serviceable, and would render it worse than useless. In proof of these observations it may be proper to state, that I have known Boats dispatched to Saugor, *via* Tolly's Nullah and the Sunderbunds, in order to ascertain experimentally, the advantages that might be gained by the difference in time between the two passages, but the difficulty in getting through the Nullah, occasioned a detention equal to one-half of the whole time occupied in the passage, and it is a well-known fact, that Boats of any considerable Draft of water can only pass through the Nullah during the Spring Tides. Dec. 13th. 1822.

In order, therefore, to render the Canal sufficiently answerable to the great object in view, it appears that its nearest junction with the Hooghly should take place at the bottom of Garden Reach, and that for the accommodation of Passengers, and the Mercantile public, on the land side of the Presidency its upper extremity should diverge into various branches terminating in Heads, or Harbours, where Goods and Passengers might be conveniently embarked. One of these might lead, with great advantage, to a place of very great thoroughfare within a quarter of a mile of Kidderpore Bridge, and the cutting of others more to the Eastward, with their most convenient points of termination, might be regulated with regard to the density of the population in the encreasing Suburbs of Allypoor, Bowanypore, and Tolly Gunge.

I am Sir, &c.
(Signed) J. KYD,
Secretary to the Committee of Management, Saugor Island Society.

CALCUTTA,
11th December, 1822.

The following Letter was received from* MR. J. KYD. Dec. 17th 1822.

* This Letter being a mere copy of the above paper marked No. II. x. the Municipal Committee do not think it necessary to print it.—J. M.

No. II. *y.*

Dec. 20th. 1822.

The following Statements and Abstract were received from the Officiating Sub-Export Warehouse-keeper.

No. 28.

STATEMENT No. 1.

Export Consignments for London.		Total.		Total.		
		Tons.	Cwt.	Sa. RS.	AS.	PS.
In the Indian Season of, ...	1813-14 ..	11,459	4	99,20,976	7	5
	14-15 ..	7,125	2	57,17,317	5	5
	15-16 ..	6,329	3	55,49,603	14	5
	16-17 ..	6,140	14	56,03,973	11	5
	17-18 ..	7,999	2	93,00,759	7	5
	18-19 ..	5,165	13	69,41,175	13	6
	19-20 ..	5,703	6	93,52,473	7	3
	20-21 ..	9,017	1	98,71,518	9	11
	21-22 ..	5,248	15	95,18,763	7	10¼

No. II. *y.* (1)

No. 2

No. 29.

Statement exhibiting the Gross Freight of Sloops, their Number, and Tonnage, employed in the transport of Export consignments for the following Seasons.

	Eastd. No. of Sloops.	Amount of Tonnage.		Gross amount of Freight.		
				Sa. RS.	AS.	PS.
In 1813-14, (Including private Tonnage,) ..	182	13,912	6	58,900	10	11
14-15	142	11,245	5	38,898	15	8
15-16	58	3,793	1	14,428	9	8
16-17	64	4,434	12	18,781	12	11
17-18	121	9,049	3	35,268	4	11
18-19	97	6,940	9	24,817	11	1
19-20	104	9,614	7	32,864	12	9
20-21	93	7,243	15	36,535	9	1
21-22	104	5,550	3	27,714	7	9

(Signed) F. MACNAGHTEN.

Dec. 20th. 1822. No. 39.

No. II. y.[2]

ABSTRACT.

Freight disbursed for Sloop hire at Bengal during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ships Registered. Tonnage.		Tonnage of Export Cargo.		Delivered at Diamond Harbour.		Delivered at Saugor		Total Freight.		
1813-14.	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.	Sa. RS.	AS.	P.
Northampton, ..	545	0	571	1	..		534	9	5,959	8	9
Marquis of Wellington,	961	0	575	1	170	0	375	2	1,334	9	6
Metcalfe,	819	0	780	1	59	9	419	11	2,344	0	11
Baring,	820	0	726	19	..		426	19	2,351	6	11
Fairlie,	698	0	649	7	..		415	15	2,120	4	8
Devaynes,	600	0	645	7	17	17	349	19	1,908	14	9
Ocean, ..	532	0	555	12	..		342	13	1,738	12	6
Huddart.	547	0	708	8	..		343	12	1,708	2	9
Retreat,	505	0	425	4	..		256	4	1,137	9	0
General Stuart,	600	0	630	9	..		328	3	1,671	12	9
General Kyd, ..	..		400	0	..		200	0	656	4	6
Carnatic,	820	0	308	0	..		310	16	563	11	7
Union, ..	723	0	724	3	71	0	433	4	1,839	15	11
Vansittart,	..		400	0	..		283	7	929	11	9
Hugh Inglis, ..	820	0	308	0	..		61	7	104	15	7
Princess Charlotte of Wales, ..	978	0	574	17	..		431	10	1,525	11	0
William Pitt. ..	819	0	727	4	179	0	551	15	2,852	7	5
Streatham.	819	0	545	13	..		580	11	1,951	6	4
Lord Melville..	818	0	308	0	..		101	7	338	7	11
Moffat, ..	776	0	885	6	..		635	9	3,224	14	5
Marchioness of Exeter,	820	0	733	10	..		758	1	3,306	5	1
Sir William Pultney, ..	565	0	585	12	..		150	11	743	11	3
Northumberland,	600	0	789	10	..		331	18	1,558	5	0
Batavia.	555	0	555	15	..		98	9	331	4	0
Minerva,	534	0	534	1	..		136	1	448	12	0
Lord Forbes, ..	513	0	462	15	..		157	0	597	11	9
Lady Lushington.	590	0	710	2	..		424	13	2,134	11	5
Union, ..	550	0	644	13	..		253	5	1,286	11	8
Tottenham,	518	0	626	1	..		235	0	992	7	6
Earl Howe,	876	0	..		..		385	18	2,345	15	6
Inglis, ..	..		313	5	4	0	228	8	1,210	0	0
Diana, ..	600	0	608	0	..		521	9	3,292	3	6
Sent to Diamond Harbour. ..	..		..		2,333	14	..		4,389	11	4
	[19,921	0]			2,835	0	11,077	6	58,900	10	11

No. II. y.[2]—(*Continued.*)

ABSTRACT.

Dec. 20th, 1822.

Freight disbursed for Sloop hire at Bengal during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ship Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour.	Delivered at Saugor.	Total Freight.
1814-15	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Sa. Rs. As. P.
Devonshire.	820 0	768 8	186 11	696 16	3,981 4 0
Ernaad.	..	536 14	175 11	..	416 0 3
Astell.	820 0	824 11	133 7	370 1	2,173 15 11
Europe.	820 0	794 3	100 0	435 0	2,386 0 9
Surrey	819 0	755 1	..	733 12	3,530 9 3
Bengal,	955 0	409 11	..	409 10	765 3 3
Prince Regent,	973 0	597 11	..	566 2	2,135 7 10
Alexander,	600 0	480 14	151 12	239 13	1,965 0 9
Lord Keith,	599 0	546 11	184 11	151 6	1,434 7 9
Phœnix,	818 0	374 13	..	274 15	1,237 2 11
Warren Hastings,	1,000 0	410 1	..	410 13	1,467 4 10
Lady Castlereagh,	820 0	341 7	..	341 7	1,125 7 2
Marchioness of Ely.	952 0	837 3	..	816 0	3,854 9 6
Coldstream,	693 0	547 9	55 7	148 15	725 11 1
Ann.	508 0	406 7	172 19	..	324 5 9
Royal George,	1,200 0	429 8	..	434 15	2,153 4 0
Cuffnells,	1,200 0	453 5	..	453 6	2,198 14 0
Larkins.	657 0	629 4	..	244 4	924 10 9
Sent to Diamond Harbour,	..	..	3,229 12	..	6,099 7 11
	[14,231 0		4,389 10	6,855 15	38,898 15 8

Dec. 20th, 1822

No. II. y.[2]—(Continued.)

ABSTRACT.

Freight disbursed for Sloop hire at Bengal, during the nine following Seasons, on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ships Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour.	Delivered at Saugor.	Total Freight.
1815-16.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Sa. Rs. As. P.
East Indian, ...	..	520 15	..	181 1	860 8 8
Metcalfe, ...	819 0	696 1	..	316 4	1,083 4 11
Apollo,..	652 0	436 5	118 10	..	194 11 9
Marquis of Wellington, ...	961 0	509 11	..	176 4	582 10 0
Princess Charlotte of Wales,..	978 0	528 19	..	193 12	649 11 6
Carnatic, ...	820 0	325 3	..	324 3	1,154 15 2
Northumberland, ...	600 0	533 17	..	180 0	678 4 9
Sir William Pultney, ...	565 0	417 5	5 10	..	10 5 0
William Pitt, ...	820 0	738 17	..	403 17	2,051 14 9
Lord Melville, ...	818 0	723 18	..	389 9	2,007 15 2
James Sibbald, ...	647 0	760 0	661 11	..	1,789 7 0
Minerva.	976 0	351 13	..	133 2	444 15 0
Lord Castlereagh.	812 0	745 4	..	552 15	2,334 10 3
Fairlie, ...	698 0	261 5	.	10 10	35 3 9
Percy, ...	...	461 4	..	146 13	550 0 0
	[10,166 0]		785 11	3,007 10	14,428 9 8

Dec. 20th. 1822.

No. II. y.[2]—(Continued.)

ABSTRACT.

Freight disbursed for Sloop hire at Bengal, during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ships Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour.	Delivered at Saugor.	Total Freight.
1816-17.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Sa. RS. AS. P.
Francis Charlotte,	...	476 19	..	106 14	481 4 0
Warren Hastings..	1,000 0	942 18	..	880 3	3,698 0 1
Prince Regent,	953 0	867 14	..	814 12	3,417 2 6
Asia,	958 0	343 0	..	270 17	432 14 7
Marchioness of Ely,	958 0	565 1	..	564 19	1,980 4 5
Phœnix.	818 0	717 13	..	375 1	1,791 0 7
Europe,	820 0	750 13	..	483 0	2,385 0 9
Astell,	820 0	792 7	..	777 2	3,227 6 10
Mangles,	560 0	417 3	..	26 19	141 7 9
Lady Carrington, ..	564 0	627 12	..	135 5	527 3 5
	[7,451 0]			4,434 12	* 18,781 12 11

*Qy. 18,081 12 11 J.M.

No. II. y.[12] —(Continued.)

ABSTRACT

Dec. 20th 1822.

Freight disbursed for Sloop hire at Bengal, during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ships Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour.	Delivered at Saugor.	Total Freight.
1817-18.	Tons. Cwt.	Tons Cwt.	Tons. Cwt.	Tons. Cwt.	Sa. RS. AS. P.
Ernaad.	..	520 0	120 0	.	225 0 0
Atlas,	1,200 0	412 17	..	412 17	2,170 5 0
General Kyd,	1,200 0	413 5	..	405 18	2,176 1 0
Edmonstone,	..	554 16	222 6	170 18	1,382 7 0
Streatham.	819 0	740 8	..	729 0	3,337 3 3
William Pitt,	819 0	739 1	.	579 8	3,366 8 4
Princess Charlotte of Wales.	978 0	342 18	..	342 17	1,131 4 3
Marquis of Wellington.	961 0	343 18	.	344 0	1,133 0 1
Rose,	955 0	344 0	..	343 2	1,129 15 3
Minerva.	976 0	344 18	..	344 3	1,132 1 3
Carnatic,	820 0	740 0	293 9	403 11	2,832 6 3
Thomas Grenville.	889 0	815 5	299 0	505 11	3,361 6 9
Northumberland.	600 0	857 19	370 5	517 19	2,791 10 11
Union,	550 0	317 2	302 13	..	613 7 0
Helen.	..	666 13	..	236 13	776 9 0
Lord Castlereagh.	812 0	742 11	300 0	301 18	2,564 9 7
Hastings, 74.	..	991 14	.	831 13	3,606 10 0
Susan.	..	643 11	..	193 6	602 8 4
Sent to Diamond Harbour.	..	..	498 16	..	935 3 8
	[11,579 0]		2,406 9	*6,642 14	35,268 4 11

*Q: 6,662 14—I.M.

No. II. y.(2)—(Continued.)

ABSTRACT.

Dec. 20th. 1822.

Freight disbursed for Sloop hire at Bengal, during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ships Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour	Delivered at Saugor	Total Freight.
1818-19.	Tons. Cwt	Tons Cwt	Tons. Cwt.	Tons. Cwt.	Sa. RS. AS. P.
Dorah,	..	733 7	146 13	..	431 12 0
Earl Kelly,	..	586 13	73 7	..	137 8 0
Ernaad,	..	579 15	92 11	..	126 9 0
Castle Huntly,	1,200 0	463 10	..	463 10	2,436 9 0
Dunira,	1,325 0	535 2	..	535 2	2,815 4 0
Fairlie.	698 0	627 12	106 13	245 7	1,116 3 4
Marchioness of Ely,	952 0	853 2	..	717 7	2,952 8 6
Prince Regent.	953 0	855 4	..	703 1	2,723 14 11
Asia.	958 0	342 18	..	342 17	1,129 8 0
General Hewett.	..	343 7	..	309 0	656 5 2
Warren Hastings,	1,000 0	437 19	..	437 19	1,590 2 9
Astell,	820 0	760 1	400 0	290 19	2,497 1 1
Northampton,	542 0	547 3	..	103 10	554 0 0
Phœnix.	818 0	717 16	301 6	354 3	3,180 15 7
Sent to Diamond Harbour,	..	..	1,317 4	..	2,469 5 9
	[9,266 0]		2,437 14	4,502 15	24,817 11 1

No. II. y.[2]—(Continued.)

ABSTRACT.

Dec. 20th. 1822.

Freight disbursed for Sloop hire at Bengal, during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ships Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour.	Delivered at Saugor.	Total Freight.
1819-20.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Sa. RS. AS. P.
Waterloo, ...	1,325 0	800 17	..	790 8	4,435 0 0
Atlas, ...	1,200 0	571 18	..	571 18	3,189 0 0
Streatham, ...	819 0	343 2	181 8	161 4	1,350 4 0
Rose, ...	955 0	854 5	..	805 7	3,568 0 0
Minerva, ...	976 0	877 6	..	826 16	3,848 12 9
Marquis of Wellington, ...	961 0	351 1	..	333 7	1,146 14 0
Princess Charlotte of Wales.	978 0	333 17	..	333 17	871 8 0
Carnatic, ...	820 0	740 0	..	699 2	2,846 10 7
Thomas Grenville, ...	889 0	789 0	..	755 13	3.150 12 2
Diamond Harbour Godowns.	..	..	4,155 7	..	8,457 15 3
	[8,923 0]		4,336 15	5.277 12	32,864 12 9

No. II. y.[2]—(Continued.)

ABSTRACT.

Dec. 20th. 1822.

Freight disbursed for Sloop hire at Bengal, during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships	Ships Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour.	Delivered at Saugor.	Total Freight.
1820-21.	Tons. Cwt.	Tons. Cwt	Tons Cwt.	Tons. Cwt.	Sa. RS. AS. P.
James Scott,	..	648 0	..	168 18	469 2 0
Exmouth,	..	652 0	..	129 3	423 11 6
Castle Huntly,	1,200 0	880 5	..	880 4	4,932 0 0
Astell,	820 0	550 6	..	550 15	3,074 1 0
Asia,	958 0	703 7	..	703 6	3,944 0 0
Argyle,	..	586 13	..	8 7	34 6 0
Pascoa.	..	880 0	..	333 14	1,445 14 0
Marquis of Huntly,	1,200 0	964 18	..	964 18	5,367 0 0
Dunira.	1,325 0	1,019 19	..	1,021 9	5,675 0 0
Lady Melville.	1,200 0	1,015 14	..	1,015 14	5,644 0 0
Golconda.	..	328 0	..	109 13	257 0 6
William Money.	..	200 0	200 0	..	375 0 0
Phœnix,	493 0	677 16	215 7	.	1,121 15 10
Lady Carrington.	596 0	716 12	190 3	..	651 2 2
James Sibbald,	667 0	890 7	399 16	..	1,792 6 6
Lady Raffles.	647 0	778 12	162 17	..	569 1 3
King George the Fourth.	470 0	651 16	73 0	..	324 12 4
Brampton.	492 0	333 1	..	116 11	435 5 0
	[10,908 0]		1,241 3	6,002 12	36,535 9 1

No. II. y.(2)—(Continued.)

ABSTRACT.

Freight disbursed for Sloop hire at Bengal, during the nine following Seasons on account of Goods and Stores Exported on the public account of Government.

Names of Ships.	Ships Registered Tonnage.	Tonnage of Export Cargo.	Delivered at Diamond Harbour.	Delivered at Saugor.	Total Freight.
1821-22	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Tons. Cwt.	Sa. Rs. As. P.
Liverpool, ...	..	590 12	82 7	..	180 0 0
Lowther Castle.	1,200 0	673 18	..	673 17	3,779 0 0
General Kyd, ...	1,200 0	572 16	..	572 16	3,212 0 0
Atlas, ...	1,200 0	563 11	..	563 11	3,160 0 0
Susan, ...	..	619 4	77 7	..	175 0 0
Ernaad, ...	..	551 5	33 7	..	505 0 0
Lady Flora, ...	..	47 16	..	47 16	83 2 0
Marquis of Wellington, ...	961 0	897 4		848 1	4,188 9 11
Thomas Grenville, ...	886 0	819 2	.	768 10	3,690 0 7
Barrosa, ...	698 0	510 2	..	96 1	306 8 5
Moffat, ...	..	110 4	..	110 4	660 15 0
Fairlie, ...	..	87 4	..	87 4	185 15 0
Princess Charlotte of Wales, ...	978 0	878 2		811 16	3,919 11 3
Rose.	955 0	855 17	..	777 6	3,618 9 7
	[8,078 0]		193 1	5,357 2	*27,714 7 9

*Qy. 27,664 7 9-J. M

(Sig ed) Γ MACNAGHTEN.

Dec. 23rd. 1822.

No. 31

The following Letter was received from MR. JOHN PALMER.

No. II. ≈.

To CAPTAIN R. C. FAITHFULL,

Secretary Special Committee upon Lt. Schalch's Canal Plan, &c. &c.

SIR,

I have not been able to acknowledge earlier, the honor of your Letter of the 28th October last, relative to the projected Plan, for Cutting a Canal from Calcutta to Channel Creek; nor even, at so late a period to bestow upon it that consideration, which a subject involving such various and important interests demands.

Assuming, as a general principle, that, by whatever means, the delays, and dangers, of the Navigation of the lower parts of the Hooghly River may be avoided, is a momentous desideratum to commerce, in all its branches, there can exist no question upon the utility of the measure contemplated; and if its expence, in construction and preservation, may not impose an extra Tax upon the Transit of Merchandize, and the general productions of the Country, I am not aware of any reasonable objection to the Plan.

I proceed to reply to your queries, in the Order they are submitted; and I have no hesitation in stating to the

1st. That I believe such an Inland watercourse would be eminently useful throughout the year, but more especially from March to October inclusively, when the violence of the South-East winds, or the velocity of the ebb Tides, either greatly impede the progress of all descriptions of the River Craft, or expose it to incalculable hazards; whilst from August to October, even if the Southerly winds are strong, the passage of loaded Craft upwards and [is] both tedious and full of danger. The smaller Craft, or Boats, may be considered as excluded from the Navigation for six months of the Southerly Monsoon; and the larger, or Sloops, usually consume from 10 to 15 days in the Voyage to Saugor during the first four months, and from 15 to 20 days during the latter four in bringing up Cargoes from the New Anchorage and Saugor Roads. Perhaps throughout the year the passage to and from the two Roadsteads of Saugor may be computed at 20 days: the Northerly winds impeding the returning Craft except in Spring Tides very considerably.

To the Second Question.

2nd. I beg to say that the interior Trade of the Country would more specially benefit by the Canal than European or any other external commerce; because the Natives want Capital and enterprise to alter the fragile and Cheap structure of their Boats; and courage and personal force to encounter the boisterous condition of the Hooghly from Diamond Harbour downwards throughout the blowing Season. The whole Eastern Trade through the Sunderbunds would pass through the Canal, whose quiet and easy Navigation would at all times be suited to the timid disposition of the Natives, and to the description of Boats already in use amongst them. To the Islands of Saugor it would offer similar advantages; whilst these would stimulate the Society and others, who are now rescuing those Lands from waste and the possession of ferocious Animals to greater exertions, great as they have been, than has been hitherto made in reducing them to cultivation and other useful purposes.

The Third Question

Dec 23rd, 1822

3rd. Is partially answered in my reply to the 1st; and as to the Rates of hire for River Craft, it may be said that these fluctuate with the demand ; from one to two annas per bag being paid to Diamond Harbour, and twice as much to Saugor; intermediate stations in proportion.

The Fourth Question.

4th Is anticipated by my reply to the 2nd ; and I will only add, that the Canal would essentially facilitate the clearing and cultivation of Saugor Island.

The Fifth Question.

5th. May be only answered conjecturally, for we have not yet ascertained whether it may be expedient to convert the Islands of Saugor to Agricultural or Manufacturing purposes. If the soil favor the growth of a superior sort of Cotton, that Plant may be extensively introduced. If favorable to the Culture of Rice and other Grain, the quantity of supply may be immense. If the Lands be devoted to the manufacture of Salt and Shell Chunam, many lacs of maunds of the former, and thousands of the latter, may find a passage through the Canal. The clearance of the Islands renders the supply of Wood and Charcoal temporary resources and I believe but of short duration ; for generally speaking the Jungle Trees of Saugor are small and light, and not well suited for conversion into Charcoal. The Islands are narrow, and the Wood-felling upon them is easily removable : though hitherto the want of labourers has rendered those operations tardy and expensive.

The construction of a Canal of such magnitude must produce an extended clearance of the Lands it runs through, and the accession and increase of peasantry in parts now impervious and infested with Tygers. In its train other benefits will follow, if the insalubrity of the lower parts of Bengal, are [is] ascribable to the Jungle and Marshes which cover the face of the Country ; and safe and easy communications will be established for miles in all directions from the Canal.

It is with great deference that I presume to deprecate the proposed line of the Canal or its connexion with Tolly's Nullah. To be of the utmost utility to the Country, the shortest practicable Cut should be made from some point of the Hoogley below Fort William, and as near to it as possible, into, or about that part of Channel Creek, called Lacam's Harbour in Rennell's Map: depending on the daily influence of the Tides, or otherwise, as experience may determine, and running so close to Diamond Harbour, and Culpee, as may with the aid of their respective Creeks facilitate the passage to vessels preferring to load or unload at those stations

The width and depth of the Canal seem ample for all the purposes of easy and prompt transit ; and for every description of Boats used in the Hooghley : and the suitable regulations which, with the greatest facility, may be adopted for the passage of Boats up, and down the opposite sides of the Canal, will insure an uninterrupted course to all, whether resorting to their Sails, Oars, or Train Ropes

I have the honor to be,

Sir, &c. &c.

CALCUTTA,
11*th December* 1822.

(Signed) J. PALMER

Jan 21st. 1823. No. 32.

The following Letter was received from MESSRS. CRUTTENDEN MACKILLOP *and Co.*

No. II. zz.

CAPTAIN R. C. FAITHFULL,

&c. &c. &c.

SIR, *Calcutta.*

We have to apologise for not having ere this acknowledged receipt of your Letter of the 28th October last, requesting our opinion on Lieutenant Schalch's Plan for constructing a Canal from Calcutta to Channel Creek. We now beg to say in reply, that we have seen Copy of a letter addressed to you by Mr. Kyd on the occasion; and he has in our judgment entered so fully on the subject, that further remarks from us appear unnecessary.

We are Sir, &c. &c.

CALCUTTA, *(Signed)* CRUTTENDEN, MACKILLOP AND CO.
21st January, 1823.

Feb. 13th. 1823 No 33.

The following Papers were sent in Circulation.

Fort William, 13*th February* 1823.

The Secretary to the Committee on Lieutenant Schalch's Plans sends in Circulation, for the approval of the President and Members, a Draft Report on the Saugor Canals, in reply to the letter from Mr. Secretary Mackenzie of the 3rd October last.

With the Draft Report the Proceedings brought down to this date are, also, circulated.

The Secretary proposes a meeting of the Committee at the house of the President on Monday next, the 17th instant, at 9 A. M. when the Report now sent in Circulation may be finally adopted, with such alterations or amendments as may be thought necessary. The Secretary's immediate departure for Cuttack induces him to wish to close these proceedings as early as possible



No. III.

No. 24.

To HOLT MACKENZIE, ESQ.

Secretary to Government in the Territorial Department.

SIR,

We have the honor to acknowledge the receipt of your Letter, (1)No. 717, of the 3rd October last, conveying the further instructions of the Most Noble the Governor General in Council relative to a line of Canals between Calcutta and Saugor.

(1) App. to App. I. page xix. No. I.e.

Government having concurred in the opinion, expressed in our (2)Report of the 30th September last, on the practicability of the proposition submitted through us by Lieutenant Schalch, and in the preference due to it over that suggested by Mr. Wood, it only remains now to submit for the consideration of the Hon'ble the Governor General in Council, the result of our further enquiries on the several points adverted to in your Letter under reply.

(2) App. to App. I. page xvi. No. I.*d*.

2. On the first point; viz. the probability of increase or decrease in that class of Shipping for which the Canal would chiefly be employed. The concurrent opinions of the Authorities and Individuals noted in the Margin* are adverse to the expectation of increase in the larger class of private shipping, which have hitherto frequented the Port of Calcutta. In this opinion we are inclined to join, but, at the same time to consider that Diamond Harbour and the New Anchorage must, from the obstacles to a free and safe navigation of the River Hooghly to Vessels of any class, continue to be points from which a considerable portion of the Export and Import Trade will be taken in, and discharged. Should a further opening of the Trade to India be conceded to Vessels of the lowest Tonnage, it might, we conceive, encourage the increase of the class of private Shipping which take in and discharge Cargoes off Calcutta; yet we cannot contemplate as a probable contingency, that they will supersede entirely the use of Vessels of the larger class, which are peculiarly favorable to many branches of the India Trade.

* The Marine Board.
Messrs. Fergusson, Clark and Co.—Alexander & Co.—Davidson & Co.—Cruttenden & Co.

3. Secondly. Whether assuming the successful issue of the undertaking to clear Saugor Island, any Vessels that now come up to Calcutta, would discharge, and take in their Cargoes at the New Anchorage.

On this point the (3)Board of Trade, (4)[Marine Board?] are of opinion, that on the clearance of the Saugor Island, "some of the largest Vessels that now come to Calcutta might be detained at the New Anchorage." But, this the Board justly remark would depend on the formation of Wet Docks, and the building of Warehouses on Saugor Island. (5)Messrs. Fergusson and Co. have stated, that "there is a convenience in all cases for Ships to come "off Town, but the dangers at the James and Mary, and in other parts of the River, "coupled with the delay, at times, in coming up and going down, would no doubt be a "strong inducement for Ships to remain below, particularly those of large size, were there "increased facility with regard to their loading and unloading at Diamond Harbour and "lower down." (6)Messrs. Alexander and Co. consider, that "so many causes render it ex"pedient for Ships to come to Calcutta, that they do not expect the Canal would alter the "practice; occasionally perhaps there would be an inducement, but only under particular "circumstances."

(3) App. to App. I. page l. No. II.*u*. to No. II.*u*.(2*a*).
(4) Ibid page xxxiv. No. II.*k*.
(5) Ibid, p. xxxvi. No. II.*n*.
(6) Ibid, p. xlii. No. II.*q*.

(7)Messrs. Davidson and Co., on the contrary think, that "there can be no doubt, "whatever, that Vessels of 400 Tons and upwards would prefer loading at the New Anchor-

(7) App. to App. I. page xlv. No. II.*s*.

" age and its vicinity, to coming up to Calcutta, unless indeed there is a Toll upon the " Canal, which would materially increase the expense of conveyance."

(1)Mr. John Palmer, (2)Messrs. Cruttenden and Mackillop, and Mr. James Kyd,(3) all view the opening of the Canals as holding out great advantages and facilities to the Trade of Calcutta; and we have exemplified the correctness of the conclusion by a series of Tables, appended to this Report; exhibiting the operation of the change in expense of freight, from River Sloops to the common Country Craft, which would, then, be equal to the safe transit of the Trade.

(1) App. to App. I. page lxxiv. No. II. z.
(2) Ibid lxxvi. No. II. zz.
(3) Do. lxiii. No. II. x.

4. Thirdly. As to the probable extent of the Country Trade which would pass through the Canal, considered in relation to the main articles of Salt, Firewood, Charcoal, Chunam, Rice, &c.

Our enquiries under this head have not been so successful as could be wished. The (4)Board of Trade have not been enabled to afford us any information on the subject, nor could the (5)Board of Customs, the (6)Collector of the 24-Purgunnahs, or the (7)Salt Agent to the* Eastern Division of the 24-Purgunnahs furnish any data on which to estimate the amount of the Inland Trade likely to be affected by the proposed Canal. It is, however, the unanimous opinion of all to whom the question has been referred, that the Inland Trade would avail itself of the Canal. The article of Firewood would, for a time only, be imported in considerable quantities from Saugor; but, the low brush-wood or jungle trees, growing near the sea is, as an article of Trade, neither favorable for Firewood, nor well calculated for conversion into Charcoal, and therefore, after the clearing of Saugor Island is effected, Wood and Charcoal will continue to be supplied to Calcutta from the present sources.

(4) App. to App. I page lix No. II. w. (2)
(5) Ibid. xxxviii No. II. p.
(6) Do. — ? — -
(7) Do. xlviii. No. II. e.
* Erroneously written "Western" at p. xlviii. — J. M.

Chunam would, to a large amount, be imported through the Canal, not only what may be burnt at or near Saugor Island; but that prepared in the neighbourhood of the Subtermookee, and still further to the Eastward, which is now conveyed by the route of the Lower Sunderbunds, the Doagara, and Channel Creek.

Grain and Straw in considerable quantities must necessarily reach the Calcutta market through the Canals, since they traverse, to the extent of nearly 40 miles, a very highly cultivated Rice Tract.

The chief part of the produce of Saugor Island, whatever it may be, will naturally be conveyed through the Canal. To the Salt Agency of the Eastern Division of the 24 Purgunnahs, (8)Mr. R. C. Plowden, the late Agent, is of opinion, that great benefit will accrue, and he calculates that 1,08,000 Maunds of Salt, now manufactured, will proceed through the Canal. The (9)Saugor Island Society state, that the Salt manufactured on that Island will amount to Ten Lacs of Maunds per annum. Were the foregoing estimates on Salt adopted, a very moderate Toll would cover the outlay of the projected undertaking.

(8) App. to App. I page xlviii. No II e.
(9) Ibid p lxii. No. II x.

5. Fourthly. The advantages of the Canal in providing a safe and expeditious communication with the Island and Roadsteads of Saugor.

On this head we have consulted the persons noticed in the (10)8th and 9th paragraphs of your letter, and we find the projected undertaking is universally acknowledged to be of the highest importance to Trade; the difficulty and delay experienced by Ships in getting down the River in the S. W. Monsoon, are great drawbacks on the advantages derived from taking in and discharging Cargo off Calcutta. To Shipping lying at Diamond Harbour, or the New Anchorage, the communication is difficult, and very tedious, from the latter circumstance. (11)Messrs. Fergusson, Clark and Co. remark, "additional opportunity " must be afforded for the plunder, that is frequently detected in Packages of Goods, on their reaching a distant destination." The Canal, as tending to remove this and other objections, it is conceived, would hold out advantages [which] the Shippers of Goods would gladly avail themselves of.

(10) App. to App. I. p. xx. No I. e.
(11) App. to App. I. p. xxxvii. No. II. n.

This opinion is, with slight variation, given by the last (1)named Mercantile Establishment, the (2)Marine Board, the (3)Import Ware-house Keeper, (4)Messrs. Alexander and Co., (5)Davidson and Co., (6)Cruttenden, Mackillop and Co., and (7)Mr. John Palmer, authorities which are, we conceive sufficient to establish to the satisfaction of the Hon'ble the Governor-General in Council, the importance of the advantages to be derived from a prosecution of the undertaking. (8)Mr. John Trotter, late Import Ware-house Keeper, is of opinion, that the Canal would reduce the freight charge in his Department about one-fourth, —see Proceedings, page 84.

On the subject of Insurance, the Mercantile body generally state, that Policies of Insurance are effected, "from Calcutta to the Port or Ports of destination, including River "Risk." (9)Messrs. Fergusson, Clark and Co., however state, that "the Insurance Premi-"um on Ships from Calcutta to Sea, is calculated at one per cent. If Ships did not come "higher than Diamond Harbour, and that Goods could be sent there or to Saugor, without "any risk, that it would be an object to pay for being insured against, a reduction in the "premiums would probably ensue to the extent of half per cent. on the value usually covered "on Sea Voyages."

(1) App. to App. I. page xxxvii No. II.*n.*
(2) Ibid. page xxxiii. No. II.*k.*
(3) Ditto, page l. No. II.*w.*(1)
(4) Ditto, page xlii. No II.*q.*
(5) Ditto, page xlv No. II.*s.*
(6) Ditto, page lxxvi. No II.*zz.*
(7) Ditto, page lxxiv. No. II *z.*
(8) Ditto, page l. No. II.*w.*(1)
(9) Ibid, page xxxvii. No. II. *n.*

On the general question,—the introduction of Canal Navigation, we cannot perhaps more distinctly express our opinion than by the adoption of the language of (10)Mr. John Palmer, when he states, that "assuming as a general principle, that by whatever means the "delays and dangers of the Navigation of the lower part of the Hoogly River may be avoid-"ed is a momentous desideratum to commerce in all its branches, there can exist no question "upon the utility of the measure contemplated." We would only give the scope of the reasoning, conveyed in this quotation, a more extensive adaptation by adding, that the opening of Canals in a Country where population and the produce of its soil demand a constant interchange in Articles of consumption, Home Manufactures and Foreign Commerce must be incalculably beneficial to the Inhabitants of the Country, and consequently, augment the Public Revenue, although the exact modes in which the latter result is produced, may not be reducible to the test of Arithmetical calculation.

(10) Ibid, page lxxiv. No II.*z.*

Whatever shortens distance, or lessens the expense of intercourse between the Inhabitants of different countries, and much more so between portions of the same community, is too obviously beneficial to require any attempt at demonstration; there are perhaps, few means of attaining these ends superior to Canal Navigation, and no countries can be better calculated than the Southern parts of Bengal and Orissa for its application. However much in the present instance the Foreign Trade of the country may appear to be the object of importance, it is, generally to the interest or Home Trade of a nation, that the application of Canals is productive of the most solid advantages.

6. Having replied to the several points to which our attention was particularly called by the (11) 6th Paragraph of your communication, we propose to enter into a somewhat Minute investigation of the comparative rates of Freight between the present River charges and those incurred in the transit of Merchandise by the Inland Navigation of India; which would be resorted to on the establishment of a Canal to Diamond Harbour and Saugor.

(11) App. to App. I. page xx No. I.*e.*

7. Finding that no accurate and extensive average could be obtained on the annual amount of the *private* Import and Export Trade of Calcutta, or on that of the Inland Trade from thence to the Sea; the only authentic sources of information open to us, were the Records of the Import and Export Ware-houses. The Officers at the head of those Departments have readily acceded to our wishes, and furnished, through the medium of the Board of Trade, (12)Statements of the Hon'ble Company's Import and Export Trade during a period of *nine years*, or from Season 1813-14 to 1821-22, both inclusive. These (13)Statements are recorded on our Proceedings, pages 85 and 101.

8. From these, and a (14)Statement obtained from the Town Major of Fort William, of

(12) App. to App. I. page l. No. II. *w.* (1*a*)
(13) Ibid, p. li. to lx.
(14) Do. p. xliii. No. II.*r.*(1.)

(1) Marked No. IIIa. to No. III. f. inclusive in this App.

(2) App. to App. I page xlvii. No. II. u.

the charge incurred by Government for the Transport of Troops during the past *six years*, or from 1817 to 1822 inclusive, (1)Tables are prepared and appended to this Report, shewing the *past* average Annual Expenditure, under the heads of Import, Export, and Transport of Troops. A (2) Scale for the comparative expense between river Sloops and ordinary Country Craft was obtained from Lieutenant Burlton, the officer in the executive charge of the Commissariat Department at the Presidency, who furnished the rates at which such Craft were hired by Government. From the above sources of information, the calculations in the Table are framed.

9. It appears that the average charge, incurred by Government, on the Export Trade to Diamond Harbour and Saugor, (a separate average on the charge to each of those places was not obtained,) has been Sa. Rs. 4 : 3 : 8 per Ton, and on the Imports not quite Sa. Rs. 3 : 1 : 0 per Ton. The Rates given by the Mercantile Houses average, so low as Sa. Rs. 2 : 8. The two former Rates are drawn from expences actually incurred on a series of years, while the latter merely affords the River Rates of Sloop Freight, without reference to demurrage or other contingencies, which must form large Items in producing the Nett Charge, per Ton on the transit of Cargo between Calcutta and Saugor: were proofs of the difficulty and delay in the existing Route wanting, the great difference between the Port Charge for Sloop Freight, and the sums actually expended, would afford them.

10. The following explanation of the Tables appended to this Report, in the order in which they stand, will, we trust, render the mode of treating the Financial branch of our enquiry both clear and satisfactory to Government. In them is compressed the substance of the elaborate Statements and details which are entered on our Proceedings.

TABLE NO. I.

11. Is explanatory of those which follow, and exhibits the Sloop Contract Rates for Troops; the Commissariat Rates of Hire for the Boats they engage for the same purpose, or for the transit of Stores; and lastly, a comparative estimate of the two modes of Freight and Transport. To avoid any erroneous estimate in these calculations in favor of the Canals, the time of passage to Diamond Harbour, and the New Anchorage, by the Route of the Canals is assumed as equal, or nearly so, to that allowed in the Sloop Contract by the Route of the Hooghly. There is at all times difficulty in procuring Boats for very short periods, which was a further inducement for the estimated time given in the Table. It will, however, be seen, that we have departed very widely from the estimate prepared by Lieutenant Schalch, which is inserted in the Margin.*

12. The time occupied in the passage between Calcutta and Diamond Harbour and the New Anchorage, on an average drawn from all the Statements recorded on our Proceedings, may be taken at 7 days to the former and 14 days to the latter place. But so great is the uncertainty on this head, that a three-weeks' passage to the New Anchorage is no unusual occurrence. By the Canal uncertainty is entirely obviated, and we consider that three days to Diamond Har-

(3) App. to App. I. page xlvii. No. II. uu.

* ESTIMATE.— See (3)Proceedings Page 80.

The following Calculations are for Laden Boats. Passage Boats will of course perform the Trip in a shorter space of time.

	Hours in. Going.	Hours in. Returning.	Hours in. Whole Trip.
N. E. MONSOON			
A Boat leaving Colvin's Ghaut half an hour before the Tide comes up, will reach Russapugly in			
From Russapugly to Diamond Harbour, ..	7	10	17
,, ,, ,, Rangafulla, ...	11	15	26
,, ,, ,, Channel Creek, .. .	13	17	30
,, ,, ,, New Anchorage via Bhugwakhally and Dog Creek,	23	31	54
S. W. MONSOON.			
From Colvin's Ghaut to Russapugly, under the same circumstances as stated above,	2	2	
From Russapugly to Diamond Harbour, ...	10	6	16
,, ,, ,, Rangafulla, ...	16	8	24
,, ,, ,, Channel Creek, ...	18	10	28
,, ,, ,, New Anchorage via Bhugwakally and Dog Creek,	26	16	42

(*Signed*) J. A. SCHALCH,
D. A. Qr. Mr. General.

20th November, 1822.

bour, and six days to the New Anchorage, will be found to be an ample estimate for performing the trip (to and from inclusive) by ordinary Country Craft to those places respectively.

13. The Comparative Statement closing Table (1)No. 1, assigns a lower scale of Sloop freight per Ton, than the average Import or Export charges; but the rate there given is an average from those stated by the Mercantile Establishments and other Individuals consulted, which we have before observed falls considerably below the nett cost per Ton.

(1) App. to App. I. No. III. *a*

TABLE No. 2.(2)

(2) Ibid, No. III. *b*.

14. Comprises an Abstract of Imports, details of which are entered in the (3)Proceedings, pages 85 to 88. From the Imports of the last nine years, an average is assumed for the future annual Import Trade, and the Estimate shews, what would be the charge for its transit by the existing mode of River freight; then follows an Estimate of the charge by common Country Craft, and the smaller being subtracted from the greater charge, affords an apparent saving by the Establishment of the Line of Canals. To one hundred maunds of Boat's Tonnage, is allowed 1¾ Tons in weight or measurement,—rather less than half the nominal Tonnage of the Boat.

(3) App. to App. I. p. li. No. II. *w.* *aa*

The usual practice in the allotment of Tonnage was ascertained by reference to the Army and Ordnance Commissariat Departments, and to the River Insurance Company.

TABLE No. 3.(4)

(4) Ibid, No. III. *c*.

15. Comprises an Abstract of the Exports, and in no respect varies from the form and the mode of arrangement in No. 2. From these Tables it would appear, that the freight in those branches of the public service would be reduced from an average of Rs. 41,782 : 10 : 11⅔ per annum to Rs. 12,603 : 3 : 6⅔.

TABLE No. 4.(5)

(5) Ibid. No. III. *d*.

16. Comprises the Expenditure in the Military branch, for the Transport of Troops during a period of *six years*, or from 1817 to 1822, both inclusive; affording an average charge of Rs. 16,803 : 4 per annum. In the (6)Statement furnished by the Town Major, the number of Troops is not specified; these are assumed on the amount paid; and the number, allotted to Diamond Harbour and the new Anchorage, is fixed, with reference to the quantities of Import and Export Trade, freighted from those stations, which are nearly in the ratio of one to two.

(6) Ibid, p. xliv. No. II. *d*.

17. The charge for the freight of Troops, by common River Craft, is drawn up from Lieutenant Burlton's (7)Statement; the Regulations now in force for the Tonnage of European Troops when proceeding into the interior, by water, being observed. The reduction that the Canal navigation would make in the annual charge, exceeds in proportion that on the Imports and Exports, being from Rupees 16803¼ to Rupees 179¼ : 2⅔.

(7) Ibid, p. xlvii. No. II *a*.

18. The questionable part of these calculations would seem to hinge on the reliance to be placed on the averages assumed. With regard to the Imports and Exports, Government will best decide whether there is any great decrease to be expected in the amount of the Hon'ble Company's Trade, and consequent reduction in the number and classes of Shipping engaged in it.

19. On the class of Shipping, generally, it may be observed, that large Ships are the best adapted for the reception of many valuable and bulky articles of the Indian and China Trade; and for the transport of Troops, there can be little question that their health will

best be preserved in long voyages, through every vicissitude of climate between Europe and India, on Vessels of a large class.

20. The Estimate of the number of Troops, for whom Tonnage may be required, is susceptible of more accurate demonstration than the amount of Trade. The European Troops of His Majesty, and the Hon'ble Company on the Bengal Establishment, cannot be taken at less than 10,000 men, for whom an allowance of 10 per centum per annum, or 1,000 Men, will be required to keep the Regiments efficient in strength; to these should be added, perhaps, 300 Men per annum for Invalids and time-expired Men returning to Europe; thus affording 1,300 Men, for whom Canal freight will be required.—1900 Men is the number estimated for in the Table, from which, if you deduct the 1300, only 600 Men remain, to provide for the relief of His Majesty's Corps in India; which would barely admit of one Regiment being relieved in two years, supposing that a relief brought out 800, and took home only 400 Men of all ranks

(1) Ibid, No. III.e.

TABLE No. 5.(1)

21. Is an Abstract of the results deduced from the calculations made in Nos. 2, 3, and 4, deducting from the apparent annual saving, a sum equal to the Toll which might be required on a passage through a Line of Canals between Calcutta and Diamond Harbour; the Nett Estimate produced is Sa. Rs. 28,984, or upwards of 5½ per cent. on the outlay proposed by Lieutenant Schalch.

(2) Do. No. III.f.

TABLE No. 6.(2)

22. The last in the series, refers to the Tolls which might be levied on the proposed Canals. In this portion of our task, we have been guided by the liberal views and intentions of Government, expressed in the 12th and 13th Paragraphs of your (3)Letter, in so rating the Tolls, that no additional Tax may be laid on the Trade; and this desirable object it will be apparent is obtained, should the scale we propose be adopted. Since, with reference to the lowest estimate of freight, that given in by the Mercantile body, (See Statement at the foot of (4)Table, No. 1,) the difference per Ton in favor of Canal Navigation, is to Diamond Harbour Rs. 0 : 11 : $8\frac{1}{10}$, and to the New Anchorage Rs. 2 : 1 : $7\frac{5}{10}$, while the Tolls assigned to those places respectively are Rupees 0 : 10 : 1, and Rupees 1 : 2 : 1 per Ton, adding however a small Toll for Boats when passing empty, which would happen either to or from; unless a double freight was obtained, and then they would of course be charged full Toll.

(3) Do. p. No. 1.e.

(4) Do. No. III.

23. The Mercantile body have expressed unanimously their opinion, that the Canals will only be resorted to, should no additional, or a very light, Tax be imposed on the transit of Merchandise. This assertion might be received with hesitation, as coming from an interested party. We are, however, assured that the objects contemplated by Government, in entertaining propositions for the formation of Canals, are directed to the Improvement of the Trade and Resources of the Country, and not to the realization of Revenue beyond what may cover the outlay expended in such undertakings, and in maintaining the Canals in a durable and efficient state.

For these purposes the scale of Tolls, as far as they extend, appear ample, although our Estimate is necessarily framed on a portion only of the Trade likely to contribute to the Tax. The sum arising from Government Transport alone, when added to the item of Salt from the Agency in the Eastern Division of the 24-Purgunnahs, amounts to an Annual Receipt of Rs. 20,270 : 7 : 0.

24. The collections under the heads Julker Mehal and Passage Boats, (the number of the latter although arbitrarily assumed, will not, it is conceived, be an exaggerated Estimate, considering the constant intercourse carrying on with the Shipping by Boats of this class,)

raises the Annual Estimate of receipts to Rs. 39,330 : 3 : 0, exclusive of a Nett saving to Government of Rupees 29,948. These sums so far exceed the provision required on the outlay, as it stands at present, that there cannot, we should think, be any reason to apprehend loss from a prosecution of Lieutenant Schalch's Plans.

25. We might have swelled the amount of Tolls by a speculative Statement of the Inland Trade in Grain, Straw, Firewood, Chunam, Bricks, Charcoal, and Earthen-ware, which it will be seen by Table (1)No 6, produce a very large share of the sums realized on Tolly's Nala and the Boitakanah Canal.

(1) Ibid, No. III

The articles last enumerated, will assuredly form no small portion of the Trade which would avail itself of the Saugor Canals: but as some part of the collections on them might affect collections now realized on other routes, we have preferred omitting them altogether from our figured Abstract.

26. The *private* Export and Import Trade could not be brought to account, with any reasonable degree of accuracy; these in the earliest years after the Canals are opened, would, we should imagine, produce at least one-third of the sum estimated for the Honorable Company's Trade, or in round numbers Rs. 7,000 per annum.

27. There is yet another source from whence Tolls to a small amount might be levied; viz. by the Establishment of Ferries along the Line of the Canals, at points of great thoroughfare; we have not placed this head in our Estimates, because we conceive Bridges at such places, if not very numerous, would be preferable. The receipts on the Saugor Canals would, we should hope, enable Government to afford this accommodation without burthening the inhabitants of the country with any Tax for its use.

28. Taking into consideration every branch of this subject, were we to venture a general opinion on the Total amount arising from Savings and Tolls, exclusive of Charges of Collection, we could not name a less sum than one Lac of Rupees per annum. Low, therefore, as may be the comparative rates of Toll we recommend on the transit of the Foreign Trade, with reference to the Regulations for the collection of Tolls on existing Canals, we conceive the Inland Trade should be placed on a lower scale, certainly not exceeding that established for Grain, Firewood, &c. on Tolly's Nala.

29. We entertain a somewhat confident expectation, that a reduction on our rates of Import and Export Trade may be attainable, when the experience of a year or two shall enable Government to ascertain the amount of Tonnage annually employed. Should circumstances exist to prevent the realization of this expectation, these branches of Trade, will not, if our calculations are well-founded, suffer any additional Tax, in its transit by the Tolls, as the difference of freight between River and Canal Craft would cover the sums paid on this account. The Trade of the Port of Calcutta would retain the entire benefit of any reduction in the present rates of Insurance, which security, from River Risk might produce. A boon of no small magnitude, should the opinion of Messrs. Fergusson, Clark and Co. be correct, which anticipates a probable relief of half per cent. (See (2)Proceedings, page 69.)

(2) App. to App. I. p. xxxvii. No. II. *n*.

30. Such a scale of relief, when applied to the Hon'ble Company's Trade, would amount to Rs. 58,675 per annum.* We do not possess Statements of the actual losses on the *nine years'* Trade, but it appears that from years 1819-20 to 1821-22, (Proceedings,(5) page 89.) the losses on Imports amounted to Rs. 50,992 : 10 : 11; or on those three years an average of Rs. 16,997 : 9 : 3 per annum: on the Export Trade the only mention made of losses is in (6)Proceedings' page 90; in which the Officiating Sub-Export Ware-house Keeper states, that no loss had been sustained for the past five years, but that in this season, 1821-22, "Three Sloops were

* Average Annual Imports,	Rs.	37,59,928 7 3	Proceedings (3) page 88.
Ditto Ditto Exports,	Rs	79,75,173 9 4	Ditto (4) Ditto 100.
Total,	Rs.	117,35,102 0 7	
		58,675 0 0	

(3) Ibid, No. II. *w*. (1*b*). p. lvii.

(4) Ibid, No. II. *w*. (1*c*). p. lviii.

(5) App. to App. page lix. No. II. 1*e*).

(6) App. to App. page lix. No. I *n* (2).

" stranded below, at Kedgeree, by which property to the extent of Sa. Rs. 38,000 was considerably damaged." These facts are sufficient to shew that the Estimate of River Risk is not illusive.

31. By the gentlemen engaged in clearing Saugor Island, the Canals are deemed highly beneficial to their enterprise. The (1)Society have through their Secretary, Mr. Kyd, thus expressed themselves on this point: " The opening of the Canal will most materially " facilitate the clearing and subsequent improvement of Saugor Island; increased facility " between distant places, attended with a diminution of expence, being equivalent to a " reduction of distance. It is needless to enter into an illustration of the eminent degree in " which the Island of Saugor would participate in the advantages above enumerated, as " likely to result from the construction of the Canal."

(1) Ibid, p. lxii No. II. x.

32. Mr. John Palmer speaking on the same subject, observes, (2)Proceedings, page 105, et. seq.: " I beg to say, that the interior Trade of the Country would more specially benefit " by the Canal than European, or any other External Commerce; because the Natives want " capital and enterprise to alter the fragile and cheap structure of their Boats, and courage " and personal force to encounter the boisterous condition of the Hooghly from Diamond " Harbour downwards, throughout the blowing season. The whole Eastern Trade through " the Sunderbunds would pass through the Canal, whose quiet and easy navigation would " at all times be suited to the timid disposition of the Natives, and to the description of " Boats already in use amongst them. To the Island of Saugor, it would offer similar " advantages; whilst these would stimulate the Society and others, who are now rescuing " those Lands from Waste, and the possession of ferocious animals, to greater exertions— " great as they have been—than has been hitherto made in reducing them to cultivation and " other useful purposes."

(2) Ibid, page lxxiv. No. II. z.

" The construction of a Canal of such magnitude, must produce an extended clearance " of the Lands it runs through, and the accession and increase of Peasantry in parts now " impervious, and infested with tigers. In its train other benefits will follow, if the insalu- " brity of the lower parts of Bengal are ascribable to the Jungle and Marshes which cover " the face of the Country; and safe and easy communications will be established for miles " in all directions from the Canal."

The foregoing Extracts appear to us to contain a full, and we trust, a satisfactory reply to the 11th paragraph of your Letter.(3)

(3) App. to App I. p. xxi. No. I.e.

33. We have now adverted to every point to which our attention has been directed by Government, or to which it has been incidentally drawn, in the prosecution of our enquiry, and we propose, before closing our Report, to bring to the notice of the Hon'ble the Governor-General in Council, the objections which have been made to portions of Lieutenant Schalch's Plans.

34. (4)Mr. John Trotter, (5)Mr. John Palmer, (6)Messrs. Cruttenden, Mackillop and Co., and the (7)Saugor Island Society, have deprecated the junction of the Canal with Tolly's Nala. Mr. Trotter adverting to the decrease of expense, (8)at page 84 of our Proceedings, observes, that, " much must depend upon their experiencing none of the detention they are " so liable to in Tolly's Nala." The Saugor Island Society express themselves very fully on this subject, and they propose that the Canal should be connected with the River Hooghly at Garden Reach; an arrangement similar to that laid down in Mr. Wood's proposition. The following quotation from a Letter of the Secretary to the Society is extracted from pages 94-5 of our Proceedings:(9)—

(4) Ibid page l No. II.w(1)
(5) Do. p. lxxiv. No. II z.
(6) Do. p. lxxvi. No. II.zz.
(7) Do. p. lxii. No. II.x.
(8) Ibid, page l. No II w.(1).

(9) Ibid, p. lxii. No. II.x.

" As Lock Gates are to be employed to retain water sufficient for the passage of large " Boats in the Canal during every period of the Tide, and as the projected branches " of communication with the River will be clear and unobstructed, it certainly appears in- " consistent with the importance of the objects proposed, that the City end of the Canal,

" which from the extension of villages along its banks must necessarily be the most crowd-" ed, should communicate only with the River by Tolly's Nullah : a passage so notoriously " obstructed from shallowness of water, want of breadth, number of Bridges, and masses of " Boats, that all thoroughfare is, in the Dry Season, nearly suspended.

" Tolly's Nullah already much too small to vent the number of Boats which resort to it, " and which keep increasing yearly with the increase of the City, requires to be quadrupled " in size to relieve the Trade struggling by main force to get through it, instead of being " blocked up by rendering it, also, the channel of ingress and egress for the Boats of the " Canal. Indeed if it were to be reserved for their exclusive use, it would be evidently " inadequate to afford expeditious or free passage to the number of Boats which may be ex-" pected to enter or leave the Canal at the City End ; especially as all the Bridges would " have to be passed, and in the Dry Season the bottom is dry during a great part of the Tide " under Kidderpore Bridge. The accession, however, of these Boats to the present Trade " in the Nullah, would destroy the practicability of its being serviceable, and would render " it worse than useless. In proof of these observations it may be proper to state, that " I have known Boats dispatched to Saugor via Tolly's Nullah and the Sunderbunds, in " order to ascertain experimentally, the advantages that might been gained by the differ-" ence in time between the two passages ; but the difficulty in getting through the Nullah " occasioned a detention equal to one-half of the whole time occupied in the passage, and it " is a well known fact, that Boats of any considerable draft of water can only pass through " the Nullah during Spring Tides."

" In order, therefore, to render the Canal sufficiently answerable to the great object in " view, it appears that its nearest junction with the Hooghly should take place at the " bottom of Garden Reach ; and that for the accommodation of Passengers and the Mercan-" tile Public, on the land side of the Presidency ; its upper extremity should diverge " into various branches terminating in heads or harbours, where Goods and Passengers might " be conveniently embarked. One of these might lead, with great advantage, to a place " of very great thoroughfare, within a quarter of a mile of Kidderpore Bridge ; and the cut-" ting of others more to the Eastward, with their most convenient points of termination, " might be regulated, with regard to the density of the population, in the increasing Suburbs " of Allypore, Bowanypore, and Tolly Gunge."

35. When the Saugor Island Society received this portion of Lieutenant Schalch's Plan, they were not, possibly, aware of the arrangements in progress for clearing Tolly's Nullah, and improving its navigation. So sensible are we to the force of the objections stated against this Channel, that we should not hesitate to recommend an alteration in the Embouchure of the Saugor Canal with the Hooghly, did we not consider the Saugor, as subordinate to the proposed Line of Canals through the Sunderbunds. Viewing it in connection with this great undertaking, the objections urged fall to the ground ; because, the opening a new Channel for the Eastern and South-Eastern Trade, now compelled to pass through Tolly's Nullah, would leave that passage free for the Southern and South-Western Trade.

36. There are difficulties to overcome in opening new Cuts from the Hooghly, and precautions requisite to guard against accidents from the pressure of so great a volume of Water, which must render the undertaking very expensive. There would always exist a probability that, at the New Opening an Apron of Sand might form, which would impede the free Navigation of the River. Unimportant as this consideration was in regard to the opening proposed for the Circular Road Canal at Chitpoor, a point to which few if any Vessels ever proceed, it becomes of serious import when an opening is proposed in so great a thoroughfare for Shipping as the Line of Garden Reach.

37. The suggestions of the Saugor Island Society, for diverging the head of the

Canal into various branches is well deserving of consideration; but, as the general line would not be affected by this arrangement, we are of opinion they would more fitly be matter of discussion after the Canal shall be completed, and experience shall point out the directions in which such branches would be most necessary, and most extensively beneficial.

38. The only remaining objection pressed on our attention was brought forward by the (1)Marine Board, who, duly appreciating the nature and advantages of the undertaking, were apparently alive to an apprehension, that while its importance might induce us to bring into conspicuous view the public benefits of the Scheme, we might overlook certain contingent improvements, which might facilitate the navigation of the Hooghly, and thereby detract from the usefulness of the Canals, or even render the outlay a direct loss to Government. One mean for the accomplishment of improvement in River Navigation, the Board observe, would be found in the introduction of Steam Boats.

(1) App. to App. I. page xxxiii. No. II. *k*.

39. These Boats are of such unquestionable utility, that we trust they will soon be employed on the Hooghly; they would prevent the frequency of accidents to Ships passing up or down, but would not render the River Navigable to Ships of greater draft. We cannot concur in opinion with the Marine Board, that the assistance of Steam Boats is likely to be afforded in India at low rates of hire. The nature of the machinery, and the scientific attendance such Boats demand, must seem to preclude cheapness; and prevent such an influx of Steam Vessels on the Hooghly, as should, by competition for hire, render them extensively useful to River Craft, employed in the Transit of Merchandise between Calcutta and the lower parts of the River.

40. In conclusion, we have the pleasure to submit our (2)Proceedings on the Saugor Canals, to which references are made in various parts of this Report; and to return the Maps noted in the Margin,* which were received from your Office.

(2) App. to App. I. page i to lxxxvi

* 1. A Plan of Saugor Island.
2. Do., Northern part of ditto.
3. Map by Lieut Schalch.
4. Map of the left Bank of the River Hooghly.

41. We cannot, however, close this address without acknowledging the highly useful services of our Secretary, Captain Faithfull, in condensing the information we have obtained for the preparation of this Report.

We have the honor to be, Sir,
Your most obedient Servants,

CALCUTTA, — H. SHAKESPEAR,
17th February 1823. — G. BALLARD.

No. III. *a*.

APPENDIX TABLE. No. 1.

Statement, exhibiting the charges for Freight by River Sloops and by the Common Craft, used in the Inland Navigation of India.

Charges for Transport of Troops by the Sloop Contract.—See Town Major's Statement, (3) *Proceedings page 76.*

(3) App. to App. I. page xliv. No. II. *r*. (1)

	From October to Feb.		From March to Sept.	
	Diamond Harbour, passage of 5 days.	New Anchorage, passage of 8 to 9 days.	Diamond Harbour, passage of 6 days.	New Anchorage, passage of 10 days.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Contract Charge for each European, ...	5 1 3	10 8 0	5 7 6	10 15 0
Ditto, ditto, ditto, Native, ...	3 1 9	6 5 3	3 4 6	6 9 0

Commissariat Rates for the Transport of Troops by a Canal, which should admit the use of common Patylah or Oolauk Boats. See Sub-Assistant Commissary-General Burlton's Statement, [1] ***Proceedings page 79.***

[1] App. to App. I. page xlvii

	Charge for each Boat at all Seasons to		Regulation Tonnage per Man.	Number of Men on each Boat.	Charge for each Man to	
	Diamond Harbour passage of 5 days.	New Anchorage passage of 8 days.			Diamond Harbour.	New Anchorage
	Rs. As. P.	Rs. As. P.	Mds.		Rs. As. P.	Rs. As. P.
On Boats of 300 Mds.	4 13 0	7 11 $2\frac{2}{5}$	50 30	Europeans, 6 Natives, .. 10	,, 12 10 ,, 7 $8\frac{2}{5}$	1 4 $6\frac{2}{5}$,, 12 4
Do. do. do. 500 do.	6 10 $4\frac{2}{5}$	10 10 2	50 30	Europeans, 10 Natives, .. 16	,, 10 $7\frac{3}{5}$,, 6 $7\frac{1}{5}$	1 1 $0\frac{1}{5}$,, 10 $7\frac{3}{5}$
Do. do. do. 700 do.	8 7 8	13 9 1	50 30	Europeans, 14 Natives, .. 23	,, 9 $8\frac{2}{5}$,, 5 10	,, 15 6 ,, 9 5

Comparative Statement of the two modes of Freight and Transport, shewing the apparent saving per Ton or Man by Canal Navigation—Common Country Craft being then employed.

	Charge by River Sloops to		Charge by common Country Craft to		Saving by Common Country Craft per Ton to	
	Diamond Harbour.	New Anchorage.	Diamond Harbour.	New Anchorage.	Diamond Harbour.	New Anchorage.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As P.	Rs. As. P.
Average Rate per *Ton* on Imports and Exports, ..	1 8 $2\frac{1}{2}$	3 5 10	,, 12 $6\frac{2}{5}$	1 4 $2\frac{1}{3}$	,, 11 $8\frac{1}{10}$	2 1 $7\frac{5}{10}$
					Per Man.	
Ditto ditto per *Man* for European Troops, ...	5 4 $4\frac{1}{2}$	10 11 6	,, 11 $0\frac{3}{5}$	1 1 $8\frac{1}{5}$	4 9 $3\frac{9}{10}$	9 9 $9\frac{6}{10}$
Ditto ditto ditto ditto for Native ditto, ..	3 3 $1\frac{1}{2}$	6 7 $1\frac{1}{2}$	,, 6 $8\frac{3}{5}$	,, 10 $9\frac{2}{5}$	2 12 $4\frac{9}{10}$	5 12 $5\frac{1}{10}$

E. E. R. C. FAITHFULL, *Captain,*

Secretary, Special Committee Lieutenant Schalch's Plans.

No. III. *b.*

TABLE, No. 2.

Abstract Estimate of the present Charge for Sloop Freight on Imports, with a comparative Statement of the Charge which would be incurred for an equal amount of Tonnage, were a Canal opened to Diamond Harbour and Saugor, to enable the use of the Common Country Craft.

	Quantity and Cost of Sloop Tonnage from						Grand Total of Freight and Cost.	
	Diamond Harbour.			New Anchorage or Kedgeree.				
	Amount of Freight.	Cost per Ton.	Total.	Amount of Freight.	Cost per Ton.	Total.		
	Tons. Cwt. Qrs.	Rs. As. P.	Rs. As. P.	Tons. Cwt. Qrs.	Rs. As. P.	Rs. As. P.	Tons. Cwt. qrs.	Rs. As. P.
App. to I. p. li, (I.w.(1a)) Import Freight on River Sloops during a period of 9 years, or from season 1813-14 to 1821-22 inclusive. Proceedings[1] page 85 to 87, ...	10 430 2 1	2 1 0	21,511 14 0	18,781 5 2	3 8 6	66,321 6 3	29,211 5 2	87,833 4 3
Annual Average on the above period, ...	1,158 17 3	2 1 0	2,390 3 4	2,086 9 2	3 8 6	7,366 9 7	3,245 9 1	9,759 4 0

Estimate of Commissariat Charges for Freight on the Annual Average of Imports, supposing a Canal opened and Craft used in Inland Navigation was substituted for River Sloops.

	Actual Freight of each Boat in		Hire of each Boat to		Freight required to Diamond Harbour in				Freight required to New Anchorage in				Grand Total in Freight and Cost.	
			Diamond Harbour 5 Days.	New Anchorage 8 Days.	Tons.	Boats.	Cost per Ton.	Total.	Tons.	Boats.	Cost per Ton.	Total.		
	Mds.	Tons.	Rs. As. P.	Rs. As. P.			Rs. As. P.	Rs. As. P.			Rs. As. P.	Rs. As. P.	Tons Cwt. Qrs.	Rs. As. P.
300 Maunds,	150	$5\frac{1}{4}$	4 13 0	7 11 $2\frac{2}{5}$	1,159	221	,, 14 8	1,063 2 6	2,087	398	1 7 $5\frac{2}{5}$	3,064 2 $9\frac{2}{5}$	3,246 0 0	4,147 5 $3\frac{2}{5}$
500 Ditto,	250	$8\frac{3}{4}$	6 10 $4\frac{2}{5}$	10 10 2	1,159	133	,, 12 $1\frac{3}{5}$	881 3 $5\frac{3}{5}$	2,087	238	1 3 5	2,518 2 10	3,246 0 0	3,399 6 $3\frac{3}{5}$
700 Ditto,	350	$12\frac{1}{4}$	8 7 8	13 9 1	1,159	95	.. 10 10	806 0 3	2,087	170	1 1 $8\frac{3}{5}$	2,306 9 10	3,246 0 0	3,112 10 1
														10,659 5 8

	Rs. As. P.
Average Annual Cost of Import Freight, (on a mean of the above three classes of Boats,) by Canal Navigation, Rs.	3,553 1 $10\frac{3}{5}$
Apparent Saving to Government by the Establishment of the Saugor Canal. .. .. Rs.	6,206 2 $1\frac{3}{5}$

E. E. R. C. FAITHFULL, *Captain,*

Secretary, Special Committee Lieutenant Schalch's Plans.

No. III. *c.*

TABLE, No. 3.

Abstract Estimate of the present charge incurred by Government for Sloop Freight on Exports, with a comparative Statement of the charge which would be incurred on the same account, were a Canal to Diamond Harbour and Saugor opened to enable the use of the Common Country Craft.

	Quantity and Cost of Sloop Tonnage to						Grand Total of Freight and Cost.	
	Diamond Harbour.			New Anchorage or Kedgeree.				
	Freight.	Cost per Ton.	Total.	Freight	cost per Ton.	Total.		
	Tons Cwt. Qrs.	Rs. As. P.	Rs. As. P.	Tons. Cwt. Qrs.	Rs. As. P.	Rs. As. P.	Tons. Cwt. Qrs.	Rs. As. P.
to App. li to lvi. Export Freight on River Sloops during a period of 9 years, or from Season 1813-14 to 1821-22, inclusive. Proceedings, pages 101 to 104, ..	18 625 3 0	2 1 4	38.802 1 4	53,157 18 0	4 11 1	2.49,408 15 5	71,783 1 0	2,88,210 14 9
Annual Average on the above period, ...	2,069 9 1	2 1 4	4,311 5 6	5,906 9 2	4 11 1	27.712 1 7	7,975 17 0	32,023 6 11 2/9

Estimate of Commissariat Charges for Freight on the Annual Average of Exports, supposing a Canal opened, and the Craft used in Inland Navigation was substituted for River Sloops.

Class of Boats.	Actual Freight of each Boat in		Hire of each Boat to		Freight required to Diamond Harbour in				Freight required to New Anchorage in				Grand Total of Freight and Cost.	
			Diamond Harbour 5 Days.	New Anchorage 8 Days.	Tons.	Boats.	Cost per Ton.	Total.	Tons.	Boats.	Cost per Ton.	Total.		
	Mds.	Tons.	Rs. As. P.	Rs. As. P.			Rs. As. P.	Rs. As. P.			Rs. As. P.	Rs. As. P.	Tons. Cwt. Qrs.	Rs. As. P.
300 Maunds,	150	5 1/4	4 13 0	7 11 2 2/5	2,069 1/2	394	0 14 8	1,891 3 2 2/5	5,906 1/2	1,125	1 7 5 2/5	8,602 8 0	7.976 0 0	10,553 11 2 2/5
500 Ditto,	250	8 3/4	6 10 4 2/5	10 10 2	2,069 1/2	237	0 12 1 3/5	1,575 8 10 1/5	5,906 1/2	652	1 3 5	6.934 5 0	7.976 0 0	8,509 13 10 4/5
700 Ditto,	350	12 1/4	8 7 8	13 9 1	2,069 1/2	171	0 10 10	1,442 14 10	5,906 1/2	482	1 1 8 1/5	6,643 13 1	7,976 0 0	8,086 11 11
														27,158 5 0 1/5

Average Annual Cost of Export Freight (on a mean of three classes of Boats) by Canal Navigation, Rs. 9,050 1 8

Apparent Saving to Government by the Establishment of the Saugor Canal, ... Rs. 22,975 5 3 2/5

E. E.

R. C. FAITHFULL, *Captain,*
Secretary, Special Committee Lieutenant Schalch's Plans.

No. III. *d.*

TABLE, No. 4.

Abstract Estimate of the present charge for Sloop Freight for the Transport of Troops, between Calcutta and Saugor, with a Statement of the charge which would be incurred for an equal number of Troops, were a Canal opened to Diamond Harbour and Saugor to enable the use of the Common Country Craft.

[1] App. to App. I. page xliv.

		Rs. AS. P.
Expenditure during ***Six Years***, or from 1817 to 1822 both inclusive. See Town Major's Statement,[1] Proceedings, page 76.	Sa. Rs.	1,00,081 8 0
or Annual Average on the above period.	Sa. Rs.	16,803 4 0

SLOOP CONTRACT RATES.	To Diamond Harbour.		To the New Anchorage.		Average on the two Seasons.		Total.	Grand Total.
	Oct. to Feb. 5 Days' passage.	Mar. to Sept. 6 Days.	Oct. to Feb. 8 to 9 Days.	Mar. to Sept. 10 Day.	Diamond Harbour.	New Anchorage.		
For one European.	5 1 3	5 7 6	10 8 0	10 15 0	5 4 $4\frac{1}{2}$	10 11 6		
For one Native.	3 1 9	3 4 6	6 5 3	6 9 0	5 3 $1\frac{1}{2}$	6 7 $1\frac{1}{2}$		
							Rs A. P.	Rs AS. P.
$650\frac{3}{4}$ Europeans at Rs. 5 AS. 4 P. $4\frac{1}{2}$ each, Average contract charge to Diamond Harbour.							3,431 13 0	16,830 4 0
1,250 Ditto....at 10 11 6 each, Ditto ditto ditto to the New Anchorage, ...							13,398 7 0	

Estimate of Commissariat Charges for Tonnage for the above number of European Troops.

	Total to Diamond Harbour & New Anchorage.	Grand Total
	Rs. AS. P.	Rs. AS. P.
$650\frac{3}{4}$ **Europeans at** Rs. 0 AS. 10 P. $0\frac{2}{7}$ each at 50 Maunds per Man of Tonnage on Boats from 300 to 700 Maunds each,	408 12 $0\frac{2}{5}$	1,791 4 $2\frac{2}{5}$
1,250 Ditto at 1 1 $8\frac{1}{7}$ ditto ditto ditto ditto ditto	1.382 8 2	
Apparent Saving to Government by the Establishment of the Saugor Canals, Rs.		15,038 15 9

E. E. R. C. FAITHFULL, *Captain,*
Secretary, Special Committee Lieutenant Schalch's Plans.

No. III. *e.*

TABLE, No. 5.

Abstract of apparent Saving to Government, by the substitution of a Canal for the present River Navigation between Calcutta and Saugor.

	Total of each.			Grand Total.		
	Rs.	As.	P.	Rs.	As.	P.
By Imports, vide Table, No. 2,	6,206	2	$1\frac{3}{5}$	29,179	7	5
,, Exports ,, ,, No. 3,	22,973	5	$3\frac{2}{5}$			
,, Transport of Troops, No. 4,	15,038	15	$9\frac{2}{5}$	15,038	15	$9\frac{2}{5}$
Grand Total of estimated Saving to Government by opening the proposed Canal, ... Sa. Rs.				44,218	7	$2\frac{2}{5}$
Deduct Toll leviable on Canal Navigation to Saugor, (See Table 6,) ..				15,270	7	0
Nett Annual Saving, ...				28,948	0	$2\frac{2}{5}$

E. E. R. C. FAITHFULL, *Captain,*
Secretary, Special Committee Lieutenant Schalch's Plans.

No. III. *f*.

TABLE, No. 6.

Abstract Estimate of Tolls, leviable on a line of Canals between Calcutta and Saugor, calculated on those branches of Trade now passing on the River Hooghly, in which correct Statements were obtained.

RATES OF TOLLS ON CANALS BY Reg. XVIII. of 1806, —— VII. of 1810, —— IV. of 1813,	Tolls leviable on Boats navigating Canals in Bengal.							Tolls leviable at Ferries.			
	Per Oar.	Per 100 Mds of Boat's Tonnage.					Per Boat.				
	On Budjras, Pinnaces, Bauleahs and Paunsways.	On Merchandize or non-enumerated Articles.	On Baggage, Straw, Firewood, &c. &c.	On Grain or Vegetables.	Empty Boats, Bricks, Earthenware, &c. &c.	On small Boats laden or plying in the Canal.	Saltpetre per 100 Mds. as per chilaun.	Foot Passenger with a load, Sheep, Goats, &c.	A Bullock and load.	A Palanqueen with Bearers.	Hackery and Carriage, loaded and empty.
	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
Matabangah, &c.	0 2 0	1 0 0	0 8 0	0 12 0	0 2 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
In Tumlook and Hidgilly,..	0 4 0	1 0 0	0 8 0	0 8 0	0 2 0	0 4 0	1 1 0	0 0 0	0 0 0	0 0 0	0 0 0
Eastern Canal Tolly's Nullah, ...	0 4 0	2 0 0	1 0 0	1 0 0	0 4 0	0 2 0	0 0 0	0 3 0	0 6 0	0 4 0	0 8 0
Boitakanah Canal, ...	0 2 0	1 0 0	0 8 0	0 12 0	0 2 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
On Eastern and Boitakanah Canals, the average annual collections for 3 years past are, ... Rs.	3,475	30,754	5,954	41,559	4,577	2,205	On these heads no detail of Collections has been obtained.				

No. III. f—(*Continued.*)

Annual Estimate of Tolls to be levied on Saugor Canals—Rate, being proportioned to distance navigated.

Tolls drawn up from Averages computed—Statements actually recorded on the Proceedings.			Total of each.			Grand Total.		
	Mds. of Boats Tonnage.	Station and Rate.	Rs.	AS.	P.	Rs.	AS.	P.
Govt. Imports	66,500	To Diamond Harbour at 1/3 per 100 mds	789	11	0	..		
	1,19,000	To the New Anchorage at 2/8 ditto.	2,975	0	0	..		
Ditto Exports,	1,18,500	To Diamond Harbour at 1/3 ditto.	1,407	0	0	..		
	3,26,000	To the New Anchorage at 2/8 ditto.	8,150	0	0	..		
Ditto Troops,	32,538	To Diamond Harbour at 1/3 ditto.	386	4	0	..		
	62500	To the New Anchorage at 2/8 ditto.	1,562	8	0	..		
Salt, . . .	2,00,000	From Agency Eastern Div. 24-Purgunnahs at 2/8 0 0 do.	5,000	0	0	20,270	7	0

Estimate of Tolls, under those heads whereon authentic information has not been obtained by the Committee.

	Rs.	AS.	P.	Rs.	AS.	P.
Budjras, Pinnaces, Bauleahs, or Paunsways to Diamond Harbour, average 10 per diem of 4 Oars each is 14,600 Oars at 0/5, ...	4 562	4	0			
Ditto, ditto, ditto, ditto, to the New Anchorage, or Saugor, average 10 per diem of 4 Oars each, is 14,600 Oars at 0/10 per Oar, ...	9,124	8	0			
Average Annual Collections on the Jalker Mehal for the whole line if only taken at the Rate of Collections on Tolly's Nullah and the Boitakanah Canal, would realize, ...	5,373	0	0	19,059	12	0
Total Collections, Sa. Rs.				39,330	3	0
Nett Annual Saving to Government by difference of freight, Sa. Rs.				28,948	0	2 2/5
Total Annual Receipts for covering the outlay on the Canal, Sa. Rs.				68,278	3	2 2/5

E. E. R. C. FAITHFULL, *Captain*,
Secretary, Special Committee Lieutenant Schalch's Plans.

NOTE.—The Rates of Toll might justly and advantageously be made higher in the S. W. than in the N. E. Monsoon, still preserving the average here laid down Such arrangement would proportion the payment of Toll to the amount of benefit received, and induce Boats to use the Canal in the fair Season.—R. C. F., *Secy*

APPENDIX J.

TO

SECOND REPORT OF COMMITTEE

UPON

THE FEVER HOSPITAL

AND

MUNICIPAL IMPROVEMENTS:

CONTAINING

CORRESPONDENCE RESPECTING THE DRAINING OF THE SALT WATER LAKE AND THE CONTINUING OF THE CANAL NAVIGATION THROUGH THE SALT WATER LAKE TO HOSEINABAD AND KOOLNA, AS PROPOSED BY THE LATE MAJOR SCHALCH, AND TO A CANAL TO CHANNEL CREEK, ETC.

CALCUTTA:

Bishop's College Press.

1848.

APPENDIX (J)

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PAGE.

APPENDIX (J)

No. I.

Queries put by the Committee upon the Fever Hospital and Municipal Improvements to Capt. A. H. E. Boileau, Engineers, Superintendent of Canals, &c., and his Answers thereto.

12th January, 1841.

Q. 1. Your attention is requested to the Minute of the Governor General of India, Lord William Bentinck, of date the 2d February, 1830 Appendix G. page 1.

In Para. 4 of that Minute mention is made of a New Circular Canal then executing. It is understood that this Canal is now executed and in use—its two extremities being as therein described; and the Communication with the Sea, through the Entally Canal and by a Navigable Channel passing through the Salt Water Lake, being such also. Be so good as to say whether the circumstances stated in this Para. are, in your opinion, correctly stated, and if in any, what particulars they are incorrectly stated.

A. This Canal has been executed nearly in the manner described; the Entalee Canal is however a mere *Cul de Sac*, and forms no part of the general line of Navigation between the Salt Water Lake and the Hooghly, which comprises only the Baliaghata and New Circular Canal. The Baliaghata Canal, which is about 70 feet wide, commences at the West edge of the Salt Water Lake, and runs 9000 feet, or $1\frac{3}{4}$ mile, Westward to its junction with the Circular and Entalee Canals. The latter Canal is 66 feet wide at the waterline, running 5000 feet, or nearly a mile from the West end of the Baliaghata Canal to within a few yards of the Circular Road, where it terminates. The Circular Canal commences at the junction of the Baliaghata and Entalee Canals, running first Northward and then Westward until it falls into the River Hooghly immediately South of Cheetpoor. Its length is 19,000 feet, or rather less than $3\frac{3}{4}$ miles, and its width is 72 feet, having a single Lock with a double pair of Gates immediately under the Cheetpoor Bridge.

Q. 2. You will observe upon the Plan inserted opposite page 47, the line of Canal from the Baliaghatta Canal to G, and thence to B, which it is understood Lord William Bentinck proposed for the continuance of the New Circular Canal round the Lake, as mentioned in Para. 5 of the above Minute. Your attention is requested to His Lordship's observations in Para. 9 of the said Minute,—to those of Col. Galloway in Para. 6 of his Minute No. 6 (C.) of App. G. page 46,—to the proposal of Major Schalch relative to the Channel through the Salt Water Lake at page vii. of his Memoir, A. No. I. of App. to App. G.—to the observations of Mr. Blechynden in Para. 5 of his Letter E. 14. of said App. page lxxv. Be so good as to state whether, in your opinion, the carrying a Canal through Dry ground in the direction suggested by His Lordship, would be attended with any, and what, beneficial effects, as compared with a Channel through the Lakes. Appendix G. page 47.

1st. In regard to the Navigation.

2nd. In regard to the question of Draining the Marsh.

No. I. Capt. A. H. E. Boileau, (Engineers,) 11th Feb. 1841.

3rd. In regard to the Warping up of the Marsh, if that measure should be resolved on.

4th. In regard to the Drainage of Calcutta—and be pleased to state your reasons for the opinion you have formed on these several matters?

A. The Circular Canal has been excavated without any of the evils anticipated by Mr. Blechynden.

I do not anticipate any benefit from such a Canal in any degree commensurate with its expense, though it would facilitate the bringing of all bulky articles of Country Produce into the populous Suburbs of Ballygunge, &c. But a continuation of the Circular Canal into Tolly's Nullah would answer this purpose much better.

The effect would be to substitute a circuitous for a direct line.

No advantage would be gained, as there is a sufficiently deep Cut (the Lake Channel) already in existence; a trifling benefit might result—but at an enormous outlay, as the present Lake Channel would be entirely sacrificed if a Canal round the margin of the Lake were to be substituted for it.

Lord William Bentinck himself says in Para. 12 of his Minute, Ap. G. p. 4. that the Drainage will not be affected

Q. 3. Are you of opinion that, for the purposes of the Navigation required, as well for the supply of Calcutta by Water communication with Tarda Nulla, as for a water communication between Tarda Nulla and the River Hoogley above Calcutta, reference being had to the communication in the Dry Season with the Ganges through the Sundurbunds, the present Channel through the Salt Water Lake from the end of the Entally Canal to Tarda Nulla is sufficient in depth and breadth, and other facilities required for Canal Navigation, particularly Towing Paths and Roads communicating with its Banks? Whether if the Channel is, in your opinion, defective in any of these, or in other respects, it might be rendered by improvements, which you can suggest, adequate to the purposes of such Navigation, and preferable, either in point of convenience and eligibility, or of expense, to a new Canal cut through Dry ground? If so, be so good as to state what those improvements are, and what would be the probable expense of them?

A. The number of boats paying Toll, which entered the Canal from the Salt Water Lake in the year 1839 was, ... 40,625

And in A. D. 1840. 62,915

The number which entered the Circular Canal from the River Hooghly in the year 1839 was, ... 10,828

And in A. D. 1840, ... 16,955

Hence the entire number of boats frequenting this line of navigation, exclusive of Canoes and other small boats in the year 1839, was, ... 51,453

And in 1840, ... 79,870

Average per Annum, ... 65,662

Taking the six months ending 31st August in each year, when it appears that there is the smallest quantity of Traffic on the Canals, the total number of boats paying toll in six months of 1839, is 23,397

1840, ... 31,385

Average of the half year, ... 27,391

Leaving an Average for the half year, including the Winter months (when the Nuddea Rivers are shut) amounting to 38,271 Boats. The traffic during the Winter half of the year is therefore, to that of the other half, as 14 to 10 nearly: so that whatever accommodation may be sufficient for boats during the Rainy Season, would require to be increased nearly one-half more in the cold weather, as far as the traffic in the immediate neighbourhood of Calcutta goes.

No. 1. Capt. A. H. E. Boileau, (Engineers,) 11th Feb. 1841.

The present accommodation for Boats is not quite sufficient for the great number of Boats which come to discharge their cargoes within these Canals, but it seems to be sufficient for those which are merely in transit.

The Towing Paths of the Salt Lake Channel scarcely deserve the name, and might be very much improved if the Superintendent of Canals had leisure to turn his attention to them. The Towing Paths of the Baliaghatta, the Entally, and the Circular Canals are excellent, and they have Pukka roads along their banks for about five miles, which might be advantageously extended throughout their whole length.

The improvement, or rather perfecting, of the present rude Towing Path along the Lake Channel by converting it into a Carriage road for five miles, between Baliaghata and Bamunghata, might perhaps cost 40,000 Rupees, or 8,000 per mile. The construction of a Pukka Road along the South bank of the Baliaghata Canal, 15 feet broad and 11,000 feet long, from the Koolia Bridge to the Baliaghata Dock, is calculated in my Estimate No. 8, dated 21st August 1839, to cost Co's. Rs 8,5[illegible]-13-0, but this expense has not been sanctioned by Government.

A Pukka road, about 3,500 feet long, is now in progress along the North Bank of the Baliaghata Canal, at an expense of Co's. Rupees 2,152-1-0 (vide my Estimate No. 2, dated 1st October 1840); but to render it as efficient as possible it should be carried a mile farther, so as to reach the Salt Lake—the cost of which ought not to exceed 3,500 Rupees more.

Q. 4. Has this Channel been ever deepened agreeably to Major Schalch's proposal, and do you know at what expense—and if you are of opinion that it now is, or might be rendered by such improvements as you shall suggest, adequate to the purposes of such navigation? Are you of opinion that in its present state, or after the execution of such improvements, it would oppose any obstacle to the Drainage of the Marsh, or to the Warping it up, if that measure should be resolved on?

A. Not that I am aware of.

The widening it by taking out Earth for bunded Roads would I think be enough.

It would form no great obstacle either to the Draining or Warping—though it would add to the expense of them, because some provision must be made for keeping the Lake Channel navigable at all times, during either of these processes.

Q. 5 Your attention is requested to the line of the main Drain and Sewer projected by Major Forbes for the Drainage and Cleansing of Calcutta by carrying the water and filth into the Salt Water Lake, which is described in the first Report of the Committee, and is laid down by Captain Fitzgerald on Captain Prinsep's Map of the Suburbs of Calcutta in Appendix G. marked No. I. (B.) and on the small sheet Map of Calcutta inserted opposite page 180½ of Appendix D. Are you of opinion that any facility, or the contrary, would be offered to the operation of such projected Main Drain by the formation of Lord William Bentinck's proposed Canal,—or, on the other hand, by the continuance and improvement of the present Channel?

A. The improvement of the present Lake Channel by bunded roads would bring higher tides from the Soondurbuns to Calcutta, and would lessen the fall toward the Lake Level, and thereby affect the Drainage, but in a trifling degree. The same effect might be produced by Lord William Bentinck's proposed Canal.

Q. 6. Your attention is requested to the small Canal projected by Major Forbes to ascend from the Salt Water Lake through the centre of the Town—being in part the same, and for the rest following the same line with the said Main Drain and Sewers,

No. I.
Capt. A. H. E. Boileau. (Engineers,) 11th Feb. 1841.

described in the former Report of the Committee. Are you of opinion that the reception of the small boats called *Saltees* there mentioned, would materially lessen the crowding of boats in the Entally and Circular Canals?

A. The number of Canoes paying Toll at the subsiding station of Russa, on Tolly's Nullah, in 1840, was 25,420, averaging 2,118 per mensem; but I do not find that they impede the passage of large boats on that line of Navigation, nor do the Canoes on the Lake Channel appear to offer the least obstruction in that quarter.

I think not, but that if a new Canal were opened into the heart of the Town, *Saltees* would increase in number, and ply on it, without much lessening the number now plying in the Circular Canal?

Q. 7. Is the crowding of boats in the Entally and Circular Canals such at present, as materially to impede the free Navigation of these Canals; and if so, what measures would you suggest for remedying this inconvenience—and what amount of expense would it be necessary, in your opinion, to incur for this purpose?

A. Great obstructions are experienced from the numbers of boats which lie in the Canal to discharge their cargoes, which might be in part prevented by widening the Baliaghata Canal, or by excavating small Docks, here and there, as the large Docks at Baliaghata are too far off for the Merchants to make much use of them.

As a very important, and perhaps most efficient remedy, however, I would propose that the Circular Canal be continued behind Entalee and Ballygunge into Tolly's Nullah at Bhowaneepoor, which would form a new line of navigation $3\frac{3}{4}$ miles long, and would cost perhaps four Lakhs of Rupees, including all the necessary Bridges, and a large Lock—but exclusive of the Purchase of Ground.

Q. 8. Your attention is requested to Lord William Bentinck's Minute above mentioned. Para. 11—to Captain Prinsep's Memorandum and Diagram therein referred to—to the Letter of Col. Faithfull, Secretary to the Select Committee E 7. of App. to App. G. page lxi.—to Mr. Phillips's Paper, Para. 13, E. 21, *a.* page xciv. of said App.—to Mr. Cardew's Paper, page 13 and 14, E. 41, page cxlviii. of said App. from which it appears that from long before, and down to Lord William Bentinck's time, the state of Tolly's Nulla was the subject of great complaint. Have any and what measures been since taken for the removal of those causes of complaint, or is the crowding of the Boats and the difficulty of Navigation in Tolly's Nullah still such as materially to obstruct, or in any degree to endanger the communication; and if so, what measures would you suggest for remedying this inconvenience—and what amount of expense would it, in your opinion, be necessary to incur for this purpose?

A. Has nothing to do with the matter, as it refers to the deepening of Tolly's Nullah previous to the excavation of the Lake Channel.

Sensible paper. [Mr. Phillip's]

Cannot find this paper. [Mr. Cardew's.]

Tolly's Nullah Sand Banks have been dug out by me to a small extent—in addition to the former deepenings; and more work is in progress—but many other parts of this line still require to be cleared out.

The opening of the Circular Canal has taken away so much of the traffic from Tolly's Nullah that the latter is now only half of the former, though it is still traversed by 31,315 Boats per annum.

The number of Boats which paid Toll in 1839 being, ...	26,020
And in 1840	36,610
Exclusive of	25,420 Canoes.

It would, I think, be highly beneficial to open a broad Towing Path, or even a Carriage Road, along one side of Tolly's Nullah all the way from the Hooghly to the Soondurbuns, or to Pauspota Toll station, say 11 miles long, but the expense would be great about Bhowaneepoor, Kalleeghat, and Tolly Gunge, where the banks are thickly inhabited; and the expense of this work could not easily be estimated without a particular Survey being made of both banks.

No. I. Capt. A. H. E. Boileau, (Engineers,) 11th Feb. 1841.

Q. 9. Are there any other, and what other, undertakings which you would recommend for the improvement of the communication by water of Calcutta on one hand, and the Hoogley above Calcutta, on the other, through the Sundurbunds with the lower part of the Ganges and the Eastern Provinces; and if so, be pleased to state them, and your opinion in regard to the probable amount of the expense?

A. The cutting a Canal from Entalee to Bhowaneepoor has already been suggested; and another Canal ought to be dug through Mr. Heatley's lands near the Booree Gang —shortening the navigation of the Mofussil Canals two tides, or perhaps 24 hours— the distance would be 1½ mile, and the probable expense 30,000 Rupees.

A Pukka Road along the South bank of the Baliaghata Canal, already mentioned vide Query 8, would probably add to the usefulness of the new Docks excavated at Baliaghata.

COMPARED,
R. R. D.
11*th February*, 1841.

A. H. E. BOILEAU,
Capt. Engineers.

No. II.

Queries put by the Municipal Committee to Captain A. H. E. BOILEAU, *Engineers, Superintendent of the Calcutta Canals, &c. and his Answers thereto.*

19*th February*, 1841.

Q. 1. Do you see any reason to doubt the practicability of completely Draining the Marshes called the Salt-Water Lakes? Do you think this can be accomplished by an opening between these Lakes and the River Hoogley, and also by openings into a Canal which should communicate with the Sea by Tardah Nulla—and if you think it practicable by both means, which would you recommend for adoption; or would you advise the opening of both communications, to be employed at different times of the year, according to the respective levels, as these are varied at different Seasons? If you advise a Drain opening into the River Hoogley—at what point do you think it ought to enter the River? and what do you think would be the probable expense of such works respectively?

A. I do not see any reason to doubt the practicability of Draining the Salt-Water Lakes, though I do not think the execution of it to be advisable.

An opening between these Lakes and the River Hooghly would hardly answer the purpose of Draining them—the lowest Neap flood in the River (in September) being 2 feet above the highest Lake Tides; but the Lake Drainage could be effected by the Soondurbun Outlets.

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Capt. A. H. E. Boileau. (Engineers,) 4th March, 1841.

Being altogether opposed to the Drainage of the Lake, I would not recommend the attempt to be made either way—but should it be undertaken at all, I think that it could best be done in the direction of the Tardah Nullah: the general surface slope of the Lake is already in that direction, and the attempt to effect a Drainage into the Hooghly would invert the line of slope.

The most convenient point for all communications between the Salt-Water Lakes and the River Hooghly appears to be between Cheetpoor and Cossipoor.

The framing an Estimate for this work will occupy more time than I can spare for it at present.

Q. 2. What effect do you think such Drains, more particularly a Drain from these Lakes into the Hoogley, would have upon the Drainage of Calcutta, supposing the Plan of Drainage proposed by Major Forbes, and adopted by this Committee in its former Report, were carried into execution?

A. I do not think that such a Drain would have any particular effect on the run of water from the Town Sewer either in a beneficial way or otherwise; nor would it at all interfere with the Plan of Drainage for the Streets by an internal City Canal, as proposed by Major Forbes.

Q. 3. Your attention is requested to Para 10, of Lord William Bentinck's Minute above referred to—to Para. 6 of Col. Galloway's Minute, page 46 of Appendix (G.)—and to the Letter from the Military Board to the Right Honorable Lord Auckland, of date 29th August 1837.

Appendix H. page

Are you of opinion that if a Canal were cut in the direction proposed by Lord William Bentinck, and with the sides so raised, the necessity of Lock Gates at the mouth of the Circular Canal, where it takes its departure from the Hoogley, would be superseded? and are you of opinion that the dispensing with such Lock Gates, if it might be done with safety, would be attended with advantage or the reverse, and in what respects?

A. Captain T. Prinsep states the probable effect of a close channel through the Lake to Calcutta, would be to raise the waters about $1\frac{1}{4}$ feet in the farther extremity of the Circular Canal at Cheetpoor, which difference is so small, when compared with the variations of the tide in the Hooghly at the other side of the Lock Gates, that I do not think the latter could be safely dispensed with.

The waters of the River Hooghly are carefully excluded from the Canal, except when their current is purposely admitted, in order to scour out the Silt deposited by the Town Drains, and on these occasions the Navigation of the Canal is considerably impeded even by this moderate current: were there to be no Lock Gates at Cheetpoor, the banks of the Circular Canal would be injured, and very many of the boats which traverse it, would be wrecked, as occasionally happens even at present, when so much command is obtained over the waters of the Hooghly by means of these Lock Gates. The traffic on the Canals would I think, be much lessened, and the Trade seriously injured by any attempt to do away with the Locks.

Q. 4. Your attention is requested to Paragraphs 8, 10, and 14 of Lord William Bentinck's Minute—to Captain Prinsep's Memorandum, No. I. (G.) page 17 of Appendix (G.) and Schedules No. I. (G. 1) and (G. 2,) thereto annexed—to Captain Prinsep's Memoranda, No. I. (H.) page 25—to Sir Thomas Anbury's Minute, No. V. page 30—to the Answers returned to the Military Board by their Committee, No. 6, (B.) page 38—to Captain Thomson's Description of the Ground lying South-eastward from Calcutta, No. VI. (B. 1,) page 39, and Estimate No. VI. (B. 2,) and Plans there referred to—to the Minute of Lieut. Col.

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Galloway, No. VI. page 44. and the "Plan showing the means proposed by Lieut. Col. Galloway and the Committee for Draining the Salt-Water Lakes"—to the Minute of Sir Thos. Anbury, No. VI. (D.) page 48. Are you of opinion that the Warping up of the Salt-Water Lakes is practicable so as to render the large Surface of these Lakes dry for the purpose of Cultivation, and free from the generation of Marsh Miasmata—and if you are of this opinion, do you think that the so doing would in any respect endanger the Drainage of Calcutta, or in any respect which may not be obviated by an improved System of Drainage?

A. I am of opinion that the Warping up of the Salt Lakes is practicable so as to bring their entire Surface under Cultivation; which measure would I think be highly beneficial in many ways, and I would strongly advocate the adoption of this measure in preference to making any attempt at Draining them.

Though temporary inconvenience might be sustained during the progress of such a work, by the drying of the mud deposited in the present site of the Lake in the course of season, yet I do not think that the neighbourhood would even at those times be at all more unhealthy than it is at present; the atmosphere in the immediate vicinity of the Lakes being now very pestilential, and several of my people have died from its effects.

After the work of Warping shall be completed, and the surface of the Lakes raised two feet above their present level, and brought under cultivation, I do not suppose that their neighbourhood would then be nearly so unhealthy as it is at present. A large area which is now nearly worthless as well as noxious, would be brought under cultivation, and become most valuable arable land, at a cost far below the returns that may be expected, should this great work be carried into execution.

It would not, in my opinion, in any way endanger nor interfere with the Drainage of the City beyond the trifling difference of level already adverted to in my answer to Question 3, which need scarcely be taken into consideration.

Q. 5. The Committee observe that Captain Prinsep states that the surface of these Lakes is naturally divided into three compartments—the Western, Eastern, and Southern, —and he proposes to commence with the first of these. Do you agree with him and Col. Sir Thos. Anbury on the propriety of thus commencing the Work, and are you of opinion that it would be necessary or expedient to form Bunds in the direction suggested by Sir Thos. Anbury, or in any, or what other direction, or what other expedient would you propose for stopping the current of the coloured water of the Hoogley so as to insure a deposit, if it shall be deemed advisable to bring the River water for silting into the Lakes? and are you of opinion that the work ought to proceed progressively in the manner proposed by Sir Thos. Anbury?

A. I agree with Capt. Prinsep in his proposal to commence the process of Warping upon that portion of the Salt Lakes nearest to Dum-Dum, and of course concur with Sir Thos. Anbury, as far as his plans coincide with those of Captain Prinsep's: but I do not think the Lakes ought to be drained previous to their being Silted up, as appears to be recommended by the Chief Engineer.

Without a more intimate acquaintance with the localities of the Lake than I now possess, it would be difficult to say which would be the best lines for the required embankments; but whatever particular distribution of bunds might be adopted, it would I think be expedient that the banks of the present Lake Channel should form part of the line of embankment, as proposed by Colonel Galloway and others.

It would I believe be the best way to execute the work progressively, and to see that one portion of the Lake is fairly silted up before the turbid waters of the Hooghly are turned upon any other portion of it.

No. 11 Capt. A. H. Boileau, (Engineers,) 14th Ma[illegible]

Q. 6. Are you of opinion with Sir Thos. Anbury that there would not be any difficulty in bringing the coloured water of the Hoogley to the Western Lake through the Circular Canal so as to afford sufficient Deposit for Warping up the Lake, and this without any prejudicial effect upon the Navigation of the Canal, which might not be guarded against or obviated if found to exist; or do you think that a separate Feeder from the Hoogley, above the mouth of the Circular Canal, direct into the upper part of the Lakes ought to be formed for the sole purpose of silting up these Lakes? At what distance above the Lock at Chitpore Bridge, do you think such Feeder Canal ought to take its departure from the Hoogley—of what dimensions ought such Canal to be—and of what velocity—of what depth at its mouth below the surface of the River at high and low water during the Freshes and the dry weather can such Cut in your opinion be made in such way as to secure it from accident and from endangering the vicinity—and if so by what means—and what do you think would be the expense of such Canal provided with all such necessary means of safety and efficiency? Are you of opinion that the opening of such Canal would be attended with any more difficulty or danger than attended the opening of the River into the Circular Canal?

A. It would be scarcely practicable to use the Circular Canal in any way as a Feeder of muddy water to the Lake, without doing serious injury to the Canal Banks, and materially obstructing the navigation, by which great inconvenience would be occasioned to the Public, and a material loss of Revenue to the Government in the Toll Department, beside the increased expense of keeping the Canal in repair.

It has been suggested that a Feeder to the Lake should be dug from the Circular Canal East of the Bridge on the road to Dum-Dum, which would save more than a mile of cutting, and do away with the necessity of building two or three large Bridges; but the injury which would be done to the Canal and to the Boats all along one of its most crowded portions would forbid the adoption of this Scheme.

A separate Cut should, in my opinion, be made about 3,600 feet north of the Cheetpoor Bridge, so as to intersect the Barrackpoor road above the Telegraph Tower, by which one very large Bridge could be dispensed with, and no injury would be done to the estates of Baboos Dwarkanath Tagore and Ashootos Day, for which heavy compensation might otherwise be claimable; and this line would bring the Feeder through ground which is now of comparatively small value, but which might eventually be greatly improved by turning the Feeder (after the process of warping should be completed) into a navigable Canal for small Boats plying between Kasheepoor [Cossipoor] Belgachia, Kishunpoor, and Bamunghata, to which place an open channel should be preserved while the Lakes were being silted up, so as to preserve a communication between the Tarda Nullah and the new Canal from Cossipoor, which would relieve the Baliaghata Canal from much of its present crowding, as it is barely large enough for the great quantity of traffic on it.

With respect to the dimensions of the new Feeder, the section of 200 square feet recommended by Captain Prinsep, seems to be quite enough for the supply of muddy water, but it might be increased to 300 feet with advantage (i. e. 68 feet wide at the water line, 32 feet width at bottom, and 6 feet depth of water) should it be determined to convert it eventually into a navigable Canal— and I see no reason to differ from Captain Prinsep's suggestions that the current should not be allowed to exceed $2\frac{1}{4}$ @ $2\frac{1}{2}$ miles per hour.

The highest Lake tide in August, and the highest ebb in the Hooghly for the same month, being exactly identical in height, Captain Prinsep has assumed this point, or 2 feet above zero, as the best level for the floor of the Feeder, at its Hooghly mouth, and zero (that is the ordinary flood tide level at Baliaghata), or perhaps one foot below this level for the floor at the Lake mouth: but a level nearly 6 feet lower than this would have to be assumed for the Feeder, if converted into a Canal for Boats.

Sluices might easily be constructed so as to do away with all danger of inundation, and would command the current admitted from the Hooghly so as to prevent the banks of the Feeder from being injured. No. 11. Capt. A. H. E. Boileau, (Engineers,) 4th March, 1841

Captain Prinsep's Estimate, Appendix G. No. 1, (G. 1.) of the Municipal Committee's Report will give a very good idea of the expense attending the execution of such a Feeder as he proposed; and the enlarged one recommended by me would probably cost rather more than double his Estimate, or in round numbers 3,00,000 Rupees.

Q. 7. Are you of opinion that the Salt Water being embanked out, and alluvion-charged water admitted into the Lakes. Sluices would be necessary for the discharge at ebb tide of such water, or of Rain water—and if so, be pleased to state how many—where placed—and at what expense.

A. I think that the Bunds may be made with overfalls in such a manner as to supercede the necessity for constructing Sluices

Q. 8. The Committee observe that the Committee named by the Military Board on the subject of Draining the Salt-Water Lake, reported their opinion that the alluvion-charged water should be admitted by the Canal, meaning it is supposed the Circular Canal, and also by a Feeder joining the Hoogley and the upper end of the Lake, adopting herein, as it should seem, a suggestion of Sir Thomas Anburey's. Are you of opinion that this double source of supply of alluvion-charged water would be advantageous, or the contrary, to the desired Warping of the Lakes,—or if so, injurious to the Navigation?

A. I am of opinion that the supply of alluvion to the Salt Lakes, should be entirely drawn from a separate Feeder, as the making use of the Circular Canal for this purpose would be injurious both to the Canal and to the Boats which navigate it.

Q. 9. The said Military Board Committee also reported that the Drainage of Calcutta to the Northward of Durrumtollah would not be affected, and that of the ground to the Southward of that Street would be much improved by the Works they proposed. Are you of opinion that this would be so, independent of the adoption of the System of Drainage proposed by Major Forbes, or some similar system.

A. I concur with the Military Board's Committee in thinking that the Drainage of the Northern part of the City would not be injuriously affected by the construction of the proposed Works, and that the Drainage of the Southern Suburbs would be improved by them: but I also consider that the improvement of the Drainage in the latter portion of the Town, would be effected in a far higher degree by the excavation of a Canal between Tolly's Nullah and the Entalee Canal, as lately recommended by me; and I think that the Drainage might be perfected without following the Plan recommended by Major Forbes, which provides for giving double the present fall for the Drains, whereas I consider that there is quite fall enough at present for carrying off all the Rain and other water, if the slopes of the Drains were properly managed.

Q. 10. The Committee observe that the Honble. the Court of Directors, in their Dispatch to the Government of India, under date the 18th January 1837 (No. 2 of 1837) para. 4, referring to the Dispatch of the Government of India under date 17th of February 1834 remark, that great inconvenience appears to have arisen from the accumulation of Silt deposited in the Canal by the Calcutta Drains, which the Honble. Court state to be an undeniable evil (para. 6); that it appears that the conduits which discharge the Drainage of the City into the Canal, were found to afford too easy a vent for the Drain-water which carries a large quantity of suspended matter into the Circular Canal; and (para. 7) that Appendix H. Page

No. II.
Capt. A. H. E. Boileau, (Engineers,) 4th March, 1841.

this was causing considerable injury to the Canal, and required the application of an immediate remedy. In Para. 19 the Honble. Court observe that there can be little doubt that after the communication with the Hoogley has been completed the alternate flow of water between that River and the Salt-Water Lake, will have some effect in clearing the accumulation at the mouths of the Drains—but they state that they are not however without their apprehensions that this is an evil which will not be remedied at so easy a rate as the Government of India anticipated, and that the most economical mode suggested as the remedy: viz., the throwing a bund across the Canal and removing the deposit by means of hand labour must materially increase the annual expenditure on account of the Canal. Are you of opinion that this view taken by the Honble. the Court of Directors is a correct one; and if so, that it would be of importance to the keeping the Canal clear from the accumulation of Silt and filth in its bottom, and to the keeping down the annual expenditure on account of the Canal, if all the Drains and Sewers of Calcutta, when these latter shall be constructed, were so formed as to empty themselves into one main Sewer or Drain, which should be discharged into the Salt-Water Lake, below the point of communication of the Circular Canal with that Lake, agreeably to Major Forbes's, or some similar Plan?

A. The evil arising from the deposit of Silt in the Circular Canal owing to the too easy vent afforded by the mouths of the Drains, appears to have been partially remedied by low walls built across the mouths of the principal Sewers, by which their undue slope was corrected, and much of the Silt retained upon the floors of the Drains at the back of these low walls.

Much of the Silt however still finds its way into the Circular Canal, whence it is scoured into the Baliaghata Canal by the admission of a current from the Hooghly through the Cheetpoor Lock Gates: but after this current meets the Flood tide from the Soondurbuns it appears that a considerable portion of Silt is checked in its progress toward the Lake Channel, and being brought back by the flow of the tide is ultimately deposited in the Entalee Canal, which acts as a kind of large mud-trap, nearly a mile long, and requires to be dug out by hand labour every four or five years.

This operation has just been completed by me, about 7,22,065 cubic feet of mud having been excavated from the bed of the Canal; and the Honorable the Chairman of the Municipal Committee has had an opportunity of witnessing the manner in which this work is done. The estimated expense was only Rs. 4,528-10 6, and this sum will more than cover the actual cost—so that the annual expense of clearing the Silt from this Canal, may be taken in round numbers at 1,000 Rupees, and the emptying of the Dhurmtollah Cess-pool (which is contiguous to it) at 500 Rupees more.

The total expense, per annum, for keeping this part of the Canals clean, is, therefore, about 1,500 Rs. per annum, and I have not, to the best of my recollection, expended even a single rupee in keeping clear either the Circular or Baliaghata Canal during the two years that they have been under my charge. The Baliaghata Canal will however require to be cleared out by and bye, and supposing that the above total of 1,500 Rupees per annum to be doubled by this expected operation, the aggregate expense for keeping the Canals clear from mud would be only 3,000 Rupees a year,—whereas the annual income derived from the Tolls on their line is upwards of 70,000 Rupees.

The Municipal Committee may, I think, fearlessly adopt any System of Drainage that may seem best to them for removing the Scourings of the City, without anxiety as to where the mud will ultimately be deposited; the Canal Department being quite competent to get rid of all the Silt that may be discharged from Drains and Sewers properly constructed, for which purpose the Conservancy Department of Calcutta and the Superintendent of Canals ought always to act in concert, and to be in amicable communication with each other.

With proper precautions (particularly by the construction of large Cess-pools at

the mouth of the other principal Sewers, similar to that one at the mouth of the Dhurmtollah Drain) very little mud would find its way into the Canals at all, but the expense of emptying these Cess-pools would fall rather heavily on the Conservancy Department, though such a system would after all be infinitely less expensive than the Plan proposed by Major Forbes.

No. 11. Capt. A. H. E Boileau, (Engineers,) 4th March, 1841.

Q. 11. The Honourable Court in the Dispatch above mentioned (para. 2) observe that of 3,50,000 rupees authorized for the operations of the Circular Canal only 2,02,155 rupees had been expended, and (para. 22) they declare that the expenditure that is absolutely necessary to render practically useful such works as have already received their approval is unavoidable. Are you of opinion as an Engineer, that the providing, if possible, for the discharge of the filth, and Mud and Silt, with which the Drains of Calcutta are charged, without depositing them in the Circular Canal, is necessary—or would be highly conducive to render that work practically useful to the extent to which it must have been intended to benefit the community, and the Revenues of the Government?

A. I have on a former occasion laid before the Municipal Committee an Abstract of the Sums expended in completing the Circular Canal, with its Lock Gates, Bridges, Roads, and Drains, which Memorandum is repeated here for convenience of reference.

Mr. James Prinsep's Memorandum Book C.—ID. April 1834.

Amount actually expended on Canal (Circular, 19,000 feet long), ..				1,22,404	10	8¼
5 Bridges (Baliaghata, Norkooldanga, Maniktola, Dum-Dum, and Barrackpoor), ...	72,856	14	3½			
1 Unfinished Bridge at Ooltadanga, ...	5,953	12	7			
Raising roadway to Chitpore Bridge, ...	1,166	15	1½			
				79,977	10	0
58 Drains, ...				20,345	7	5¼
Road (about 19000+4000=23,000 feet long,) ..				44,128	6	10
				2,66,856	2	11½
Single Lock (60 feet long and 22¾ @ 24 feet wide.)				61,098	7	11
Total Sicca Rupees,				*3,27,954	10	10½

I have already suggested that Cess-pools might be constructed at or near the debouchures of the principal Drains to catch the mud, and to allow only the water from the Town to run into the Canals, nor do I think that any other provision need be made by the Town Conservancy. for getting rid of such mud or silt as might after all find its way into the Canal. This could I think be cleared away by the Superintendent of Canals without materially interrupting the traffic, or incurring any further outlay than 3000 @ 4000 rupees per annum for the Northern portion of the City, and perhaps as much more for the Southern portion, should the Circular Canal be continued to Tolly's Nullah.

Q. 12. Have you had any opportunity of becoming acquainted, from report or otherwise, with the effects of the accumulation of filth and silt in the Entally Canal upon

* If to this sum (Rs. 3,27,954-10-10½) be added Rs. 9,56,650-2-4† for the Purchase of Ground, the total cost of forming the Circular Canal will appear to amount to Rs. 12,86,604-5-3½—this however is ot borne out by the Statements‡ annexed to a Report by the Military Board to the Governor of Bengal, dated 27th October, 1835, which state the Total cost of constructing the Circular Canal up to 1st May 1835, to be Rs. 14,80,488-0-1¼—Again, if to the most correct of the above sums the Total cost of constructing the Soondurbun Canals up to 1st May 1835, viz. Rs. 3,70,665-1-8¾ be added, it will exhibit the whole cost of executing, so far as it has been executed, viz. to the Juboona or Ishamuttee River, the late Major Schalch's Plan.§—J. M.

* Proceedings 17th November, 1835, No. 2.

† Proceedings 17th November, 1835, No. 1.

‡ Proceedings 1st November, 1830, No. 13 and 15.

§ Appendix to Appendix G. page 1 and xxvii xl. ccxxii.

No. 11. Capt. A. H. E. Boileau. (Engi-) [illegible]4th March, 1841.

the health of the inhabitants of its banks ? If so, be pleased to state what, according to your information, those effects have been ?

A. I have never had any complaints made to me of the insalubrity of the Entalee Canal, nor do I observe that the people who inhabit its banks are less healthy than those who reside in other parts of Calcutta ; but Mr. Blaquiere, who has had the experience of very many years, has given evidence of an opposite nature, which ought to have more weight than mine.

Q. 13. Have you had occasion to observe the state of health, and appearance in point of health, of the inhabitants of the borders or of any habitable parts of the interior of the Marsh called the Salt-Water Lake ? and if so, be pleased to state the result of your observations in these respects. Be pleased also to state the description of the Marsh in the close neighbourhood, or generally to the windward of such habitations—whether the waters are deep enough always to cover the whole ground, and to what depth, or the ground is only partially so covered,—much of it which is not actually covered with water being damp, or but little raised above the water, or the surface is generally subject to be covered, and left dry as the tide flows and recedes ?

A. There has been great sickness and mortality both in my Toll-collecting establishment at the station of Dhapa Monpoor on the Western margin of the Salt-Water Lakes, and also among the people employed by me in driving piles along the South bank of the Baliaghata Canal. The mortality among the former I attribute entirely to local causes, as my people appeared to have sunk under endemic disease arising from Marsh Miasmata, but the deaths on the Baliaghata Canal have, I believe, been caused by Cholera Morbus, or some epidemic disease, and not from local insalubrity.

I am not sufficiently familiar with the Salt Lakes to describe their appearance accurately, but as far as I have seen them, the surface seems to be alternately wet, and dry, according to the state of the tide—except in such portions as are kept altogether dry (during the cold and hot Seasons only) by means of embankments.

Q. 14. Are you of opinion that before commencing the operation of Warping, it is necessary to Drain that part of the Lakes which it is proposed to Warp—and could such drainage be so speedily and effectually completed as to avoid the powerful generation of Marsh Miasmata which has been known generally to attend the incipient and progressive drainage of extensive marsh ?

A. I do not think that it would be advisable, on any account, to attempt the Drainage of the Salt Lakes previously to their being Warped up ; and I greatly fear that injurious results would arise from undertaking any such operation, by which so large a surface of Pestilential soil, and Miasmatiferous matter would be exposed, to the great detriment of every person living in its neighbourhood, or to leeward of it.

COMPARED,
(Signed) HURLOLL.

A. H. E. BOILEAU,
Capt. Engineers.

No. III.

COMMITTEE ROOM, TOWN HALL,

Thursday, 18*th March*, 1841.

MR. A. DYSON, *Examined.*

No. III. Mr. A. Dyson, 18th March, 1841.

Q. 1. We understand you are the Overseer of the Intallee Suburb?

A. Yes,—for twenty-four years. I was two years in Balleygunge.

Q. 2. How long have you resided in Intallee? and what has been the state of your health during your residence there?

A. Twenty-four years. I have never been sick but once, and that was on the occasion I was attacked with a Jungle Fever whilst superintending the repairs of a cutcha road, close to the Salt Water Lake in the year 1819.

Q. 3. How far is your residence from the Intallee Canal? Is it in an open space?

A. About one thousand yards. It is tolerably open round my house; but there are many trees in all the gardens of Intallee.

Q. 4. Are you much acquainted with Calcutta?

A. Not much with Calcutta; my duties lead me to the Suburbs, upon the Baunhoogly and Barrackpore roads.

Q. 5. Can you form an opinion whether Calcutta is more healthy than Intallee?

A. I think Intallee is the most healthy.

Q. 6. Can you form an opinion of the state of health of the Native inhabitants of Intallee? And what do you think the most frequent Diseases?

A. I think the state of health of the Native Inhabitants in the Western parts of Intallee, is superior to that of the Native Inhabitants of Calcutta.—Cholera, Dysentery, and other bowel complaints, also Fevers and Spleen, are the most frequent Diseases.—I have treated many cases of Cholera. No one that I have treated has died. I give to an adult forty drops of Spirits of Ammonia and forty drops of Laudanum, mixed with two spoonfulls of water.

Q. 7. Have you noticed many cases of Intermittent Fever, and at what Season?

A. I have observed many cases of fever with great warmth of body and no cold fits. I have had the misfortune to lose in 1825-26, three sons from Spleen, one thirteen years and ten months, one ten years and nine months, and another eight years and six months—this was at Intallee.

Q. 8. Have you observed heavy fogs in Intallee as compared with those of Calcutta?

A. I cannot say; I never go to Calcutta in the morning. The fogs of the Suburbs are heavy.

Q. 9. Have you observed to what cause that may be attributed?

A. To want of Drainage, dirty tanks, and decayed vegetable matter.

No. 111.
Mr. A. Dyson,
28th March, 1841.

Q. 10. How far do you reside from the Salt Water Lake? Have you observed fog come from that quarter?

A. Two miles. I cannot say that I could observe very heavy fogs whilst working down there; but I think the fogs of the Salt Water Lake about the same as those of Intallee. I wish to observe, that there are many Drains in Intallee which are not cleaned out; I have not the men to clean them. I had formerly only one Division under my charge, (Intallee,) I had then 250 Convicts, and could keep the drains quite clean; this was in Mr. Elliott's, and subsequently Mr. Barwell's time. I have at this time in Intallee only seventy Convicts. I have now two Divisions under my charge, which formerly were under two Overseers, each having control over 200 to 250 Convicts. I receive no extra allowance for the extra duty imposed on me.

Q. 11. Do you observe any difference in the healthiness of the inhabitants since the drains have not been kept clean?

A. I have observed a great difference; formerly, in Mr. Elliot's time, there was not so much sickness. All the gardens are now overgrown with jungle, and the roads overhung with trees, which obstruct ventilation. If people were forced to keep their grounds clean, it would be a wholesome regulation.

Q. 12. What do you consider the healthiest period in Intallee?

A. I have experienced it to have been the healthiest in November, December, January, and February. In March, April, and May, it becomes less healthy. In May and June I have had several cases.

Q. 13. Is July, do you think, a healthy month?

A. I find the Convicts become ill in that month. I keep them in the Guard two or three days—beyond that time I send them to the Hospital.

Q. 14. Do many of the Convicts become ill in that month?

A. Yes, I have in that month eight or nine Convicts ill; this continues much the same during the Monsoon, (August and September). In October, not so ill.

Q. 15. Do you recollect any other class of disease which is common in Intallee?

A. No.

Q. 16. Have you many cases of Small-pox; and do many people die of it?

A. Several Convicts have had the Small-pox, but only one of them died of it, and that three or four years ago.

Q. 17. Have you observed any difference in the healthiness of the people who reside on the banks of the Intallee Canal, as compared with those who reside at some distance from it?

A. I am not sensible of any difference. I know several families residing on the banks, but only one of them, viz. the family of Mr Marks, was formerly, about two years ago, unhealthy.

Q. 18. Do you know if any persons reside near the Salt Water Lake?

A. Mr. Crow is the nearest Christian, who resides the nearest to the Salt Water Lake, and his family is healthy. There are many natives who live close to the Lake. On the western side of it there are three or four villages close to the bank of the Lake, the houses or huts are within a few yards of the bank.

Q. 19. Do you happen to know the state of health of the people who live there?

A. I do not know any thing of the state of the health of those about there; my duties do not frequently lead me to the vicinity of the Salt Water Lake.

Q. 20. Are you acquainted with the condition of the Natives employed in making mats?

A. No.

Q. 21. What is the depth of water in the Salt Water Lake?

A I do not know. In the Monsoon the water covers nearly the whole of the Salt Water Lake.

Q. 22. How is Intallee supplied with Drinking water?

A. Chiefly from tanks. There is a tank on the ground belonging to the Intallee Conservancy Committee, the water of which is at present undrinkable on account of the quantity of putrid vegetable matter accumulated in it; but I am now employed in cleaning it out, when it will be available to the public. We have no other public tank.

Q. 23. Is the water of the tanks wholesome?

A. Yes; the Tank of Mr. Beeby, and the Mooteejheel in Moonshee Aumeer's ground, which is close to Mr. Beeby's, and there is another tank, Debnarain Day Baboo's, on the Coomardanga road, about half a mile from the others. There is another on Puddoopooker road, a private tank, but all the people take water from it, as they do also from the other private tanks except in the Hot season, when the owners, from a fear of their tanks becoming dry, prohibit water being taken from their tanks by the poor native inhabitants, which puts them to great inconvenience and distress. There are many private tanks; but I cannot vouch for the goodness of the water which they may contain.

Q. 24. Are you of opinion that the Suburb of Intallee is amply or very scantily supplied with good water for the use, in Drinking and Culinary purposes, of the poorer classes of the native inhabitants?

A. It is very scantily supplied with good water.

Q. 25. Have you witnessed any material suffering by a want of good water?

A. I have amongst my own Convicts. I have been obliged to send them to Debnarain Baboo's tank; but since Mr. Twentyman has rented, on the South of my residence, a spot of ground, on which there is a good tank, I send, with Mr. Twentyman's permission the Convicts to that tank. There is no supply of proper water for the public; my Convicts have a tank of their own; but the water is not drinkable.

Q. 26. Have you any wells in Intallee?

A. We have wells, but the well water is not good.

Q. 27. Are you acquainted with there being any natural springs of sweet water in the Suburbs?

A. In a jheel I made at Russapagla, I found several springs of sweet water, the jheel is now the jheel of the Russapagla Hospital, which it supplies with water. It is not a tank, but a serpentine piece of water. Bricks were formerly made in the place where the jheel is; I made the jheel, if I recollect right, twenty-four feet deep; it took about three months to make, with about thee hundred and fifty Convicts; it was made in 1817. I think there must have been the course of a river there, for I found fragments of boats, and pieces of soldier's coats with buttons; no figures were on the buttons.

No 111.
Mr. A. Dyson,
18th March, 1841.

Q. 28. In what state generally are the tanks of the Suburbs?

A. The tanks, with a few exceptions, are covered with green slime, and full of grubs and insects.

Q. 29. Can you state whether any process of purification of the water is employed by the inhabitants of Intallee?

A. I cannot say. I drink mine as it comes from the tank.

Q. 30. Do you know the number of the population of Intallee?

A. No.—I cannot say; I took the census once, and gave it to the Magistrate about five or seven years ago.

Q. 31. Are there many Mussulman residents in Intallee as compared with Hindoos?

A. Yes; about three Hindoos to one Mussulman. I cannot speak with certainty.

Q. 32. Where do the Mussulmans bury their dead?

A. They have a Burying ground at Manicktolla; another between Manicktolla and Narcoldanga; a third at Gobra; and a fourth at Bamunbustee, or Cossiabaugaun.

Q. 33. Are the Burying grounds at all offensive?

A. No: I cannot say that they are. I have passed frequently through them, and have never found them to be so.

Q. 34. Where do the poorer Christians bury their dead?

A. There is one Portuguese Burying ground at Boitaconnah; and one on the Arreetollah or North Intallee road; and another at Mirzapoor: and the poorer Christians of other classes occasionally bring their dead to the Scotch Burial ground.

Q. 35. How do the Hindoos dispose of their dead? Are any ever carried to the Salt Water Lake?

A. They carry them down to the River. I am not aware of any ever being carried to the Salt Water Lake.

Q. 36. How is Intallee off in regard to Drainage?

A. The drains run off pretty free when kept clean, which is not always the case.

Q. 37. Could you keep them clean if you had a sufficient establishment?

A. Yes; formerly in Mr. Elliott's and Mr. Barwell's time, they were kept quite clean. I used to take the levels myself, and when in the control of a larger establishment, the drains were kept so clear, that the water ran pleasantly through them.

Q. 38. Is there a sufficient fall towards the Lake to keep the whole of the Suburb of Intallee well drained?

A. Yes, except sometimes when there is a heavy fall of rain for seven or eight days, then the drains are all full; sometimes the Salt Water Lake, during spring tides, is so full, that it choaks all the drains. I have then seen all the low lands about the Lake covered with water, and all the villages about there, surrounded with water.

Q. 39. What effect do you think the Draining the Salt Water Lake would have upon the health of the neighbourhood?

A. I think if the Salt Water Lake was drained, that it would make it more healthy after some years—but not immediately, on account of the rotten jungle and weeds. I think if several very large tanks were dug in the bed of the Lake and in the Low Lands about the Lake, and then bunded, and the surplus soil used to raise the ground in the vicinity of those Tanks, it would tend very early to bring the Lake, or a great portion of it, and the Low Lands about the Lake under cultivation.

No. III. Mr A. Dyson, 18th March, 1841.

Mr. Dyson retires.

No. IV.

Answers by Capt. W. R. Fitzgerald, (Engineers,) to the Queries marked No. I. and No. II. to which Answers were requested from Capt. A. H. E. Boileau, by the Committee upon the Fever Hospital and Municipal Improvements.—Vide pp. 1 to 12, of this Appendix.

No. IV. Captain W. R. Fitzgerald, (Engineers,) 19th May, 1841.

Queries dated the 8th January, 1841.

To the answers given by Capt Boileau, to the above Queries, I generally concur.

Queries dated the 4th March, 1841.

Q. 1.

A. I do not see any reason to doubt the practicability of Draining the Salt Water Lakes. I agree with Captain Boileau, in thinking it "could best be done in the direction of the Tardah Nullah." and I would not recommend any opening into the Hoogly River for this purpose.

Q. 2

A. If the Drain in question would answer for draining the Salt Water Lake, I do not think it would have any detrimental effect upon the Drainage of Calcutta.

Q. 3.

A. In agreement with Captain Boileau.

Q. 4.

A I am of opinion that the Warping up of the Salt Water Lakes, so as to render their surface fit for the purposes of cultivation, is practicable ; at the same time the Lakes must be Embanked in order to prevent any admission of the Salt Water from the Sundurbunds spreading over the ground when thus raised. The Draining and Warping of the Lake, would I think, improve the healthiness of the neighbourhood, and would not in any way interfere with the Drainage of the City.

Q. 5.

A. I agree with Captain Prinsep, in thinking it advisable to commence the process of Warping upon the nearest portion of the Lake, and I would construct the Embankments for this purpose with reference to the general Drainage of the Lake—making any intermediate ones that the separate divisions of the Lake might render necessary.

No. IV.
Captain W. R Fitzgerald, (Engineers,) 19th May, 1841

Q. 6.

A. In agreement with Captain Boileau.

Q. 7.

A. I am of opinion that Sluices should be constructed in the Embankments for the discharge of Rain and other water admitted into the Lakes. Their number, position, and expense must depend upon circumstances scarcely determinable without a minute examination of the localities.

Q. 8.

A. In agreement with Captain Boileau

Q. 9.

A. I am of opinion that the Drainage of Calcutta would not be affected either beneficially or otherwise, by the works recommended by the Military Board Committee.

Q. 10.

A In agreement with Captain Boileau

Q. 11.

A. Ditto ditto

Q. 12

A. Ditto ditto.

Q. 13.

A. I believe the vicinity of the Salt Water Lakes to be considered unhealthy, but I am not able to confirm this opinion by any local knowledge of my own.

Q. 14.

A. I am of opinion, that it would be advisable to Drain the Lakes, even if they are not Warped ; and the doing so would, I think, improve the healthiness of that part of the country. If the Warping system is practised, the portion of the Lake under the operation ought, it appears to me. at any rate to be Drained. If any water is allowed to remain, so much the less will be let in, and a proportionate less quantity of alluvion deposited, and the time which the operation would otherwise take, will consequently be prolonged.

W. R. FITZGERALD,
Captain, Engineers

FORT WILLIAM.
19th May 1841.

No. V.

Answesr by Major H. DeBude, (Engineers,) to the Queries marked No. I. and No. II. to which Answers were requested from Capt. A. H. E. Boileau, by the Committee upon the Fever Hospital and Municipal Improvements.—Vide pp. 1 to 12, of this Appendix.

No. V. Major H. DeBude (Engineers,) 3rd June 1841.

No I.

Query. 1.

Answer. I have not the slightest reason to doubt the correctness of Captain Boileau's Answer to this Question.

Q. 2.

A. As a Channel of Communication, I see no necessity for the Cut through the Dry ground on the South side of the Lake.

For the Drainage of the Lake, it would doubtless be advantageous if accompanied by an Embankment, Dams, and Sluices ; but I believe that the present Lake Channel may be used, as far as it goes, for this purpose, and that the proposed Channel is not indispensably necessary. Captain Boileau refers to Lord W. Bentinck, as saying that this Channel would not affect the Drainage, but His Lordship proposed the Channel expressly for this purpose ; he said it would not affect the Drainage of Calcutta, not that of the Lake.

It may however be observed, that if the Outlets for letting off the Lake water are not on a level with the Bottom of the Lake, the mere fall of rain water will suffice to flood it again every year, unless the surface is artificially raised.

Q. 3.

A. Captain Boileau's answers to this Query are I believe correct.

Q. 4. Doubtless the Lake Channel would form some obstacle to the Warping up of the portion of the Lake which lies South of it, and it would require an Embankment on each side to keep its own Channel clear

Q. 5. I agree with Captain Boileau's Answer.

Q 6 Ditto ditto.

Q. 7. Ditto ditto.

Q 8. Ditto ditto.

Q. 9. Ditto ditto.

No .II.

Query. 1. I believe it to be practicable and desirable to Drain the Salt Water Lake. I do not recommend drainage into the Hooghly on account of the height to which tides rise in the River, as compared with the level of the Lake and adjacent country. The drainage may I believe be effected in the direction of the Tarda Nulla.

No. V Major H. DeBude (Engineers) 3rd June 1841.

The expense can only be satisfactorily estimated by a person who may be specially nominated for this duty, and who could devote his time to it.

Q. 2. A drain into the Hooghly giving free admission to the tides, would doubtless affect the Drainage of Calcutta, inasmuch as with such a Channel open, there could, for several hours of the day be no drainage at all, the drains being all filled with back water from the River. If the communications with the River were placed under command by means of lock gates, the effect on the drainage would not be injurious, and, as regards the Southern portion of the Town, would I believe be beneficial.

Q. 3. I concur with Captain Boileau in thinking, that the lock gates at Chitpore could not safely be dispensed with.

Q. 4. I believe the Warping up of the Salt Water Lakes to be practicable and desirable, but I think it desirable to Drain them also, and I look on the Drainage as more immediate and more certain in its effects than the Warping. I would however recommend the trial of both. I do not anticipate any injurious effects to the Drainage of the City from either operation.

Q. 5. I agree with Captain Boileau, excepting that I would Drain the Lakes as well as Warp them up.

Q. 6 I concur generally with Captain Boileau

Q. 7. I do not think it would be right to trust to overfalls alone for letting off the fresh water from the Lake. Sluices would I believe be necessary, but I cannot say how many would be required.

Q. 8. I concur with Captain Boileau.

Q. 9. I concur with Captain Boileau.

Q. 10. Ditto. Ditto.

Q. 11. I have no reason to doubt the correctness of Captain Boileau's answer

Q. 12. I cannot answer this Question.

Q. 13. I have no reason to doubt the correctness of Captain Boileau's answer

Q. 14. I think the Drainage of the Lake a certain process, and I recommend it. I do not suppose that the effects of laying its surface permanently dry, will be at any time so bad as that of the alternate exposure and inundation which now occurs.

The process of Warping would, I believe, be very slow, but would I think be ultimately effectual. I recommend the trial of both, but if I were obliged to limit myself to one process, I would prefer the Drainage as more immediate and certain.

CALCUTTA, *(Signed)* H. DEBUDE,
3rd June, 1841. *Major of Engineers.*

No. VI.

Queries put by a Medical Member (JOHN GRANT, ESQ. Surgeon) of the Committee upon the Fever Hospital and Municipal Improvements, to W. C. BLAQUIERE, ESQ. Magistrate, Calcutta Police, and his Answers thereto.

No. VI. W. C. Blaquiere, Esq. Magistrate, Calcutta Police, 5th June, 1841.

25th February, 1841.

Q. 1. You are understood to have resided for some time back at the Suburbs of Entally. Will you be good enough to say for what length of time?

A. I have resided at Syalda, (not Entally,) since April 1794.

Q. 2. How far is your residence at Entally from the Entally Canal, and how far from the Government House, Calcutta?

A. My residence is near the Bytaconna, about three hundred yards North of the Entally Canal, and about one mile and three-quarters from the Government House.

Q. 3. Is your house well situated, will you be so good as to say, in a street, or in the midst of a piece of open ground or garden?

A. My house is situated on the South side of the Bellyaghat road, in the centre of an open piece of ground, at some distance from the road, and upper-roomed.

Q. 4. Are there trees near your house, and are there many generally speaking in Entally?

A. There are very few trees near my house, but a great many all over in Syalda and Entally

Q. 5. Which do you consider the most healthy locality, Calcutta or Entally?

A. I consider Calcutta healthier than the Suburbs, that is Syalda and Entally.

Q. 6. On what reasons do you found your opinion?

A. This opinion is founded on the general observation which I have made, of the comparative degree of sickness prevalent in the Town and Suburbs, and the degree of malignity thereof.

Q. 7 Is not Entally more liable to heavy fogs than Calcutta?

A. Entally and Syalda are not more subject to heavy fogs than Calcutta, but on the contrary less so

Q. 8. Will you favour me by saying which you deem the healthiest Season of the year at Entally?

A. I consider the hot Season the healthiest Season of the year.

Q. 9. Are the Inhabitants subject to any particular class of disease, and what?

A. I am not aware of the Inhabitants being subject to any particular class of disease, except bilious fevers, disordered spleen, and intermittent fevers.

Q 10. Have you any recollection of epidemics, and of what nature, visiting Entally?

A I am not aware of any epidemic visiting Entally and Syalda except Cholera, and the Small-pox, at such times as Calcutta has been visited by the same.

No. VI.
W. C. Blaquiere, Esq. Magistrate, Calcutta Police, 5th June, 1841.

Q. 11. Have you had any opportunities of becoming acquainted from report or otherwise, with the effects of the accumulation of filth and silt in the Entally Canal,* upon the health of the Inhabitants on its Banks, or on the Suburb of Entally in general, and if so be pleased to state what, according to your information and observation, these effects were?

A. I have observed a very material change in the salubrity of Syalda since the excavation of the Entally Canal in 18 , previous to which sickness was very rare in the neighbourhood, whereas since the excavation of the Canal, fevers, particularly those of a bilious type, have been highly prevalent, which I attribute in great measure to the existence of the Canal, and its stagnant and filthy state.

The Inhabitants are of opinion that the bad effects of the Entally Canal, are less felt since the excavation of the Bagbazar Canal in 1835, which has in some measure diminished the evils above stated, by causing an influx and reflux of water into and out of the Entally Canal, which was scarce perceptible before.

Q. 12. Have you had occasion to observe the state of health and appearance in point of health, of the Inhabitants of the borders, or any habitable parts of the Marsh called the Salt Water Lake, or generally to the Windward of such habitations, and the depth of the water, or if deep enough to cover the whole ground or otherwise, and how these spots are affected by the flux and reflux of the tide?

* Vide Appendix D. p. 152.—J. M.

A. *I consider the neighbourhood of the Salt Water Lake exceedingly unwholesome, particularly to new comers; as many years ago, during the time of administration of the Marquis of Wellesley, I had occasion to establish a Police Chowkee in the vicinity of the Lake to prevent the escape of French Prisoners of War by that route, and deputed a party composed of fife healthy up-country Birjbassies, the greatest part of whom, to my astonishment in the course of a few days, were prostrated with severe bilious fevers, which rendered it necessary to relieve them, by sending another set, who were equally unable to withstand the pernicious effects of the Malaria of the Lake, and were withdrawn after the loss of two of the number, who fell victims to the Pestilential influence of the Lake, which deterred me from sending any more there.

Natives of Bengal, do not appear equally susceptible of the influence of the Lake, as many reside in the vicinity with impunity, although it is generally admitted to be unwholesome.

My garden not being in the vicinity of the Lake, I have not had opportunities of observing the depth of water in the different parts thereof, or how the same are affected by the flux or reflux of the tide.

Q. 13. How is Entally supplied with Water, and do you consider the Water to be of good quality or otherwise?

A. There are a few Tanks of good water in Entally, but a great deficiency thereof in Syalda, in consequence of which the Native Inhabitants of both the Town and Suburbs in the vicinity of my garden, resort by hundreds daily to a Tank of very pure water in my premises, from which several European families also obtain water, by which my Tank is reduced annually to five or six feet of water.

Q. 14. Are the Tanks quite clean, and free from green scum and vegetation?

A. The tanks in European and Native gentlemen's gardens, are clean and free from scum and vegetation, others not so; and there is a great want of good Public Tanks in my opinion; many who have Tanks not being willing to allow access thereto.

No. VI.
W. C. Blaquiere,
Esq. Magistrate,
Calcutta Police,
5th June, 1841.

Q. 15. Can you state whether the Water drank by the Native Inhabitants, and poorer Christians, undergoes any filtering or other preparation, before being drank ?

A. The Native Inhabitants sometimes filter their water through a cloth before it is drank, but this is not universally the practice, and they observe no other preparation.

Q. 16. Have you noted any circumstances affecting the climate of Entally in regard to Electricity ?

A. I have not noted any circumstances affecting the climate of Entally in regard to electricity, but do not think so many accidents occur from lightning in the Suburbs as in the Town.

Q. 17. Any in regard to putrefactive fermentation from decayed vegetation, or from Malaria ?

A. I am not aware of any other evil consequence resulting from the putrefactive fermentation arising from decayed vegetation or malaria, than such as may have arisen from the filthy state of the Entally Canal, or the Salt Water Lake itself.

There is a Butchery at Curraya, where Cattle are slain for the use of Fort William and the Town, which may tend to render the air in that vicinity unwholesome.

There are also numerous small shallow Tanks in the Suburbs which dry up annually, that may also emit noxious effluvia

Q. 18. Will you oblige me by saying whether you have any idea of the amount of the population of Entally, or of the ratio of deaths to births, or can you give me even an approximate idea of the monthly or annual per centage of mortality ?

A. The population of Entally is estimated by an intelligent Native at thirty thousand. I have had no means of ascertaining this myself, or the ratio of deaths to births, or the annual per centage of mortality.

Q. 19. Are there any Mussulman families at Entally, if so what may be their average number ?

A. There are many Mussulman families in Syalda and Entally, but how many in any one part I cannot say. Many Mahomedan families have left Calcutta and taken up their abode in the Suburbs.

Q. 20. Where do the Mahomedans of Entally bury their dead ?

A. The Mahomedans of Entally bury their dead principally at a place called Gobra, and those of Syalda at and near Manictulla.

Q. 21. Are you aware of any facts referable to the vicinity of public Cemeteries in Entally, or elsewhere near Calcutta, as a source of disease ?

A. There are several public cemeteries in the Suburbs, but I have never heard of their being considered as a source of disease.

Q. 22. Where do the poorer Christians of Entally bury their dead ?

A. The poorer Christians bury their dead at the Portuguese burying ground on the skirt of the Circular Road, North of the Bytaconna.

Q. 23. How is Entally off in regard to Drainage and Conservancy ?

A. I have not *have had sufficient opportunity of inspecting the Roads and Drains of

* Sic in Original. J. M.

No. VI. W. C. Blaquiere, Esq. Magistrate, Calcutta Police, 5th June, 1841.

Entally, to be able to answer this Query. Those in my neighbourhood are generally in good order.

Q. 24. What effect do you think would the Draining of the Salt Water Lake or Marsh, have upon the climate of Entally?

A. I am opinion that the Draining of the Salt Water Lake would be highly beneficial to the climate of its vicinity and Entally, but there are numerous paddy fields between the Lake and the villages in the Suburbs, which are overflowed in the Rainy Season, and dry up after the close thereof, which is injurious to the health of those residing on the skirts of the villages

Q. 25. Do you recollect any period during your residence in the Suburb of Entally, at which the healthiness of that locality underwent any material change At what period did such change occur?

What was the state of the healthiness of the locality previous to that period? For how long had you an opportunity of observing it?

What has been the state of its healthiness since, and to what cause do you attribute that change?

What are your reasons for coming to the conclusion you have now arrived at?

A. The healthiness of the Suburbs underwent a material change immediately after the excavation of the Entally Canal in the year —1807 or 1809.

Sickness was scarcely known in my own garden previous thereto, but after the excavation. bilious fevers became prevalent, followed by disordered spleen and obstinate intermittent fevers.

W. C. BLAQUIERE.

SYALDA.
5th June, 1841.

No. VII.

No. VII. F. Pemble Strong Esq. Surgeon to 24 Purgunnahs, &c. 8th June, 1841.

Answers by F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs &c. to the same Queries (commencing with the 5th Query) to which Answers were requested by the Committee upon the Fever Hospital and Municipal Improvements, from W. C. Blaquiere, Esq.— Supra p. 21 to 24.

Queries transmitted, 16th April, 1841.

Answer 5. Calcutta I am of opinion is more healthy than Entally, though Calcutta possesses in itself many causes of unhealthiness, which are noticed, as are also the causes of the unhealthiness of the Suburbs, in the Extracts (marked A. and A. 1. to A. 15. inclusive) of my Papers on the Topography of Calcutta and its Suburbs, which I beg to annex.

A. 6. Because further removed from the vicinity of the Lake and kept in an infinitely clearer and cleaner condition than Entally, where less fire, heat, and smoke exist, both to prevent the formation of Malaria and to check its power when it invades the City. It is a general opinion, though not formed on any statistical data, that those parts of Calcutta nearest the River, are more healthy than those parts near Entally, and as you approach Entally unhealthiness increases, and it has been remarked that persons going from Calcutta to Entally have often been taken ill.

No. VII. F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, 8th June 1841,

Of what may be done by Cleaning, Draining, &c. as an example, I would mention Cornwallis Square, now remarkably clean and healthy, a place described by the late Bishop Heber, as having been dreadfully unhealthy—a School and some Missionaries were formerly located in this part of Simlah. I have been many years ago called upon professionally to attend there when they were in the midst of a filthy jungle. The splendid Square and Tank and Mrs. Wilson's School began the Improvements, then the large Scotch Assembly School and the erection of a Native gentleman's mansion, and lastly the Church and Clergyman's House finishes the Improvements—it is now healthy. Baboo Kosseepersaud Ghose and his family when in their old house were extremely unhealthy, since his removal to this place he has enjoyed excellent health.

A. 7. I cannot say from experience

A. 8. There is a general impression that the Cold Season is healthy—but from a Table of Ten years I have procured of the City mortality, November and December shew the greatest mortality, but I annex general Abstract Tables,—(see Papers marked A. 13. to A. 15. inclusive) one of which shews the mortality in all the months, and I see no reason to suppose the Suburbs differ materially in this respect: the average yearly mortality in Calcutta for these Ten years is *4.64 per cent—of these cholera is found to be among Mahomedans, 0.72 per cent,

Among Hindoos,		1.31	pr. ct.
Small pox, Mahomedans,		0.119	pr. mille.
Small pox, Hindoos,		0.228	ditto.
Various diseases,	Mahomedans,	1.73	pr. ct.
	Hindoos,	3.80	ditto.

and I find by a comparison among the Prisoners at Allipore and in the 24-Purgunnahs for 20 years a similar result as regards the November and December months.

* It will be seen by reference to my Table of Mortality, which extends to 23 years, for the different classes of Inhabitants of Calcutta that the general per centage of mortality is 4.54—*Sd.* F. P. S.

A. 9. Yes,—Fevers, Dysenteries and Spleen, are among the most common diseases.

A. 10. Yes,—I have known Measles, Cholera, and Small-pox, as Epidemics in Entally in different years.

A. 11. My opinion will be found in the last paragraph of the Paper marked A. 3, and in the first paragraph of the Paper marked A. 4

A. 12. I have,—the Villagers on the borders of the Lake are great sufferers from Fevers, Continued and Intermittent, Dysentry, Spleen disease, Dropsy, and disease of the Alimentary glands, and their appearance is generally, as I have remarked in Paper A. 2. Para. 9, squalid and unhealthy; see also my observations at Para. 5 of the Paper marked A. The depth of the Lake may be said to be about knee-deep, or from one to one foot and a half deep. I believe that at every reflux of the tide a very great portion of the Lake is left exposed to the sun by day and the action of heat and damp at night.

A. 13. From a very few Tanks and Pools,—the latter are numerous, small, and dirty, and most of them dry during the hot season. See my observations on this subject in paragraphs 1 and 2, of the Paper marked A. 1, and the last paragraph but one of the Paper marked A. 4.

A. 14. Answered above.

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A. 15. The Natives generally, I believe, adopt no mode of filtering; the poorer class have no time or means, but use the water as it is daily brought from the nearest receptacle; a few of the superior Class adopt some mode of purifying the water, which they purchase from Musulmán and Hindoo water-carriers, but at a dearer price than it is sold within the Maharatta Ditch, and the Hindoos pay nearly double to the Bharrywallas, than the Musulmáns to the Bhistees.

A. 16. No.

A. 17. Yes,—see my remarks in Para. 4 of the Paper marked A. 5.

A. 18 I have attempted, but cannot ascertain the population of Entally itself. I annex a Census of the Suburbs, see Paper marked A. 12. I have no means of knowing at present the proportion of Deaths to Births, or the monthly or annual per centage of mortality in Entally.

A. 19. It is supposed that the proportion of Mahomedans to Hindoos is as one to two.

A. 20. At a Burying-ground at Tangra, Teelzilla, Manicktollah, Kassiabagan, Gobra, Kurbulla; on the road South-east to the Koolya Bridge is the Chinese Burying-ground, and towards the Eastern end of the Balliaghat Road there is a Parsee Burying-ground, and on the same road there is one for the Jews; but as regards the Mahomedans, if their relations reside within 15 or 20 coss of the City, they will often take them to their family vaults.

A. 21. The Mahomedan Burying-ground at Kassiabagan is I know considered unhealthy, from its low situation, and extremely bad Drainage: but perhaps if the above-named evils were removed, its situation as a place of burial, might not be objectionable.

A. 22. There is a Roman Catholic Burying-ground in Sealdah on the Circular Road, one in North Road, Entally, and the new Protestant Burying-ground on the Circular Road, near the head of Park Street.

A. 23. Badly Drained from the great want of Convicts. When I was first appointed Surgeon to the Suburbs and 24 Purgunnahs in 1820, there were plenty of convicts condemned for 14 years and upwards and sent from the Upper Provinces to Allipoor to work on the Suburbs Roads with our prisoners of the 24 Purgunnahs. The Entally Suburb was then kept clean, and many people took their evening drive on those Roads. One gang was stationed at Barnaghur, one in Sealdah, and one at Balliagunge, besides the one now in Entally, and there was one also at Bhowanipore; of these the Entally gang only remains, and from this guard a few Prisoners are sent to Barnaghur. There is a gang of prisoners at Kidderpore, and another over the water at Howrah. I firmly believe that the Entally Suburb can be kept clean and well Drained, for I have known it, as I have said, to have been kept so, and that for a considerable time. I am however of opinion that unless a Regulation is passed, making it imperative on individuals to keep their Grounds in a Cleanly and Healthy state by Clearing, Cleaning, Levelling, and Draining, that all the efforts of even the best directed Conservancy will avail but little to remove the many causes of disease now daily accumulating. See Paper marked A. 1. para. 1, and 2; and the state of the Grounds, described in paragraph 5, of the same Paper, equally applies to the Entally Suburb.

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A. 24. If I would understand the Question as *referring* to the operation of Draining the Lake, I have no hesitation in giving it as my opinion, after much consideration, that the Draining or the filling up with Silt, or Warping it, would not have an injurious effect either on the Suburbs, or City. Had I thought so, I would not have recommended the measure as far back as 1828. See para. 6, of the Paper marked A 1, and note at foot of para. 4, A. 3, in which I suggest Draining and Warping. I am aware that in some Climates such an operation might be attended with danger ; but here, where the Sun is all powerful, I conceive any Malaria formed under such circumstances, would be rapidly dissipated by its pervading heat. The illness produced by Drainage near Chartrese, in France, is, I humbly submit, no guide to us in this Climate, for we find in more moderate Climates than this, that the Marshes made for Rice cultivation are much more injurious than Rice Marshes here. In giving the above opinion, I would be understood, that the Land once Drained shall not be again flooded, as it *now* is, by every alternate tide. I however am of opinion that Warping the Lake would be the most advisable.

With respect to the effect that would be produced on the healthiness of the neighbourhood after all the operation in the Draining or Warping is over, there can be but one opinion, and that is, that it would most decidedly produce healthiness.—See my observations on that point in my concluding paragraph of Paper A. 1.

A. 25. I have already remarked, that 20 years ago, and for some time afterwards, the Suburb of Entally was kept in a cleanly state ; and from inquiries I have at various times made of Native doctors and others, the place was then more healthy than it has been of late years. I have officially reported to the Sudder Nizamut Adawlut upon increasing Suburb unhealthiness, and I brought the bad state of the Entally Suburb particularly to the Court's notice in the middle of the year 1828, I find in the year 1830 that I twice again remarked in my returns to the Sudder Court upon the unhealthiness throughout the Suburbs, and in this year I brought the same to the notice of the Medical Board. In 1833-4, I recollect that Entally as well as the other Suburbs were particularly unhealthy, and in the latter year the Magistrate recommended Government, at my suggestion to establish an Hospital and Dispensary at Kidderpore, that place being remarkably unhealthy. At this time I again officially brought to the notice of the Medical Board the extreme unhealthiness of the Suburbs, and in a letter to the Board, again in 1835, I repeated my sentiments upon the same subject. My impression is, that since the Inundations there has been a uniform unhealthiness througnout the Suburbs, I do not mean from any continued effect of the Inundations up to this time, but from the want of Prisoners or Workmen. If the former custom of sending Up-country Zillah Prisoners, convicted for fourteen years to work in the Suburbs of Calcutta, were again adopted, I believe these localities may be brought into their former cleanly state, although this would not effect all that is urgently necessary *for* perfect healthiness. See my Answer to Query No. 23. I have already enumerated what I consider the cause of unhealthiness, and my reason for thinking so, see Paper marked A. 5. paragraph 4, and Paper marked A. 7. paragraph 4, and following paragraphs.

I am inclined to think, in Rome and many other malarial countries, where the Thermometer does not rise so high as in Bengal, that the climate is influenced greatly by the *Character of the Soil* which perhaps remains *more permanently moist* than it does in Bengal, which is a sandy soil, and allows the water to pass quickly downward ; the subject is admitted to be full of difficulty, and the opinions of the best authors conflicting. It is not possible to analize Malaria, to say at what point of heat, with moisture and assisting vegetation it begins, or at what exact point it is dissipated by the Sun's rays or other heat ;

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perhaps the heat of a pipe or cheroot, or the warmth of the human breath, within gauze, may often prevent its action on the human subject. In the Mediterranean fires made where the sailors were procuring wood, prevented its action, where, previous to the adoption of the fires, it produced disease—but Dr. Macculloch, who tells us this, says distinctly, that Water does not check its progress, and gives proof by noticing a ship, three miles out at sea, having its crew affected by a Land wind; and he believes that wind conveys Malaria from the coast of Holland to England. Great changes in healthiness have taken place in Calcutta since my residence here, although the Thermometer has not been changed as regards heat, it is therefore fair to conclude that Improvements have been the cause. We now rarely meet with the virulent jungle fevers formerly so common. In following up these Improvements more extensively, a still greater degree of healthiness may be expected—for it is not heat alone, or damp alone, that produces Malaria, but a union of these at a time while decomposition is going on in certain matters.—Cleanliness, Airiness, Leveling, and Draining, then, are the Preventive measures to effect the desired Improvements.

F. PEMBLE STRONG,
Surgeon to Mysore Princes and 24-Purgunnahs.

CALCUTTA,
8th June, 1841.

No VII. *a*

Extracts—Papers on the Topography of Calcutta and its Suburbs, by F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, &c.

Letter, dated 29th August 1837, from F P. Strong, Esq. to T. Smith, Esq. Superintending Surgeon, Presidency Division

A

SIR,

In answer to your Circular of July 29th, forwarding for my perusal a Letter from the Secretary to the Medical Board to your address, expressing the desire of the Board to afford every practicable assistance to such gentlemen as may be engaged in drawing up Topographical accounts of Stations in your division; I have the honor to forward copies of several Papers, written some years ago, upon this City, its Suburbs, the Salt Marshes, and the Soondurbuns, South-east to the Sea; and to which I have added notes in the Margin in further elucidation. I also have annexed other papers more lately written, bearing upon the same subject, and a letter to Lord William Bentinck written by a Committee which was formed of gentlemen in the Suburbs, in consequence of my first communication upon the subject in 1828. A small map shewing the bearing of the different parts alluded to is appended, in which Mr. Tassin has, at my request, painted the Salt Lake of a bluish colour, and the low thick salt-water jangal, between the further end of the Lake and Tarda, green; while he has represented the lands granted to various persons towards the end of the year 1829 and in 1830, in yellowish green colour; to shew their position, the line drawn with carmine points out the new Eastern Canal, the purple shews the old route by Tolly's Nullah, and the orange shews the route by Channel Creek. This is a map made only last year, and is not the map I allude to in my papers for further information. There is a large one of the Lake

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and Calcutta by the late Captain Prinsep, giving the Levels also; and there are other larger Maps by Tassin, of Calcutta and the Soondurbuns, shewing all the individual Grantee's grounds, numbered, and pointing out the new Eastern Navigation, projected, and partly carried into execution, by the late Major Schalch, in a more particular manner than this small Map will admit of. One of the Letters annexed, will shew that I was called upon by the late Governor General, Lord William Bentinck, to attend a Committee at the Government House upon the subject of Draining Calcutta, and the Drainage and Silting up of the Salt-Water Lake. The Committee was composed of fourteen gentlemen, and His Lordship alluded to his own experience in such matters having induced him to call this meeting, in order that it might be continued by his successor, and mentioned his communications with the Court of Directors, and their assent to his views in the affair of Draining the Lake. The Committee was to meet again, but His Lordship's illness prevented it, and the subject appears to have slept ever since, except that the public prints have occasionally thrown out the views of different writers interested both for, and against. His Lordship had his own Plan for Draining the Lake printed, together with that of the late Captain Prinsep, and his Questions to that gentleman and the Answers thereto. There were also some other Papers annexed to these, bearing upon the subject, all of which I gave to Sir John Grant, who has given them to Lord Auckland. They are interesting as connected with the subject of my Papers, and should I be able to obtain a copy from the Military Board, or elsewhere, I will send them to you. I would add, that, when I first waited upon the Governor General, no part of the Eastern Circular Canal had been commenced upon, not a hoe had been applied to the ground, nor had a tree been felled; and I then understood, that, although the whole ground had been purchased by Government for the entire line of the New Eastern Canal, from its entrance from the Bagh-bazar floodgates to the old Entally Canal which runs into the Lake, yet, that some obstruction, or difficulty, presented itself to this improvement being effected. Viewing this as the Nucleus of all Improvements with a view to effect a Healthiness in this City, I took with me a Map of Calcutta, with the projected Canal drawn out in pencil, the more clearly to point out what I conceived of the utmost importance, and I was gratified to find that His Lordship took the same view of it that I did, and acted upon it, though I was given to understand that he met with considerable opposition; it is now however finished, and has been so for some time; there is considerable traffic upon it, and the monthly tolls form a considerable item of profit, although the failure of the Mercantile Houses has materially deteriorated the value of the ground Government have to dispose of on each side of this Canal. It has six Suspension Bridges over it, and a pucka road on its western bank.

The First Paper marked 1828, may be considered entirely Topographical, and was written about the time that I addressed the Sudder Nizamut Audawlut upon the general unhealthiness of the Suburbs of Calcutta. I informed the Governor General that I had made such a report in my Official Correspondence with that Court—and I found afterwards that my remarks were recommended to the attention of the Governor General in Council. This led to a Communication with the Magistrate of the Suburbs and 24-Pergunnahs, then one District, bringing my report to his notice, and desiring his attention upon the subject; he immediately put himself in communication with the Entally Committee, and sometime afterwards Mr. John Master, the Magistrate, shewed me a Plan of his own, for the Improvement of the Suburbs, and the Sites were marked upon his Map of the 24-Pergunnahs where he proposed to have Large Tanks excavated, and Roads made. Besides this, the Entally Committee had several interviews with Lord William Bentinck, and gave into His Lordship's hands their Plans of Improvement, of which the Letter I have alluded to, and annexed, forms only a part; they also gave in Maps of the Jungles, Roads, and Grounds

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generally, and the then price of the Land, &c.; Sites for Tanks were I know fixed upon, and marked; but His Lordship went up the country, and nothing has been done.

The Second Paper was written some months afterwards, and may be considered as departing, in a small degree, from strict Topography, since I have intermixed the subject of Soils, and of Boring for Water, Agriculture, &c. but as regards the proper formation of Tanks, the Draining off of Water, and Wells, perhaps these subjects may be considered admissible as regarding Public Health. The New Canal had been begun, and was rapidly going on, and that work threw some light upon the general nature of the soil, and confirmed the opinion given by Sir Hyde East, that the dampness of the climate was not to be attributed to the moist nature of the soil, which was thought by some to be full of springs; and it also confirmed his opinion of an ancient Forest having in former times existed much below the present surface of the earth, which however may have been forced by torrents to their present position, as numerous and large trees were every where met with—many of them in an erect position.* Such was also found to be the case in the New Canal made by Major Schalch, running Eastward from the other end of the Lake at Bamonghotta to Hoosinabad; some of the wood had arrived almost at the state they call lignite. Most other parts of this paper are essentially Topographical, and point particularly to facts, and to unhealthy localities, and although towards the end of the paper, I have advocated particularly the growth of Cotton in the Soondurbuns, as well as Coffee and Sugar, I do not like to separate or divide the paper, for I advise the measure as a main means of reducing the Jungle and Forest, and consequently of reducing Malaria. And if my Third Paper should be thought to give a long detail regarding Boring, it yet shews the exertions that were necessary on my part to keep the experiment going; and we have now attained a depth of upwards of 400 feet, well tubed with cast iron, and the operation is going on with spirit. My further remarks advocating the cutting down the Soondurbun Jungles will, I hope, though a little lengthy, be pardoned, as tending to produce a more healthy state than at present exists. I fancy myself further borne out in not selecting parts only of these Papers, or altering their original diction, from the " Sketch" of a Plan for Memoirs on Medical Topography sent round with the Circular by the Medical Board to guide us in some degree. I there see Seas, Rivers, Lakes, Wells, Morasses, Bogs, and Canals, noted as points on which the Topographer should bestow considerable attention, as they so materially affect the dryness or moisture of a Country. The Deposits, animal, vegetable, and mineral, are also mentioned, and among several other matters which I had touched upon, I find Evaporation of surface, and Vegetable Products mentioned, and an allusion to the comparative healthiness of the Villages in the *Netherlands*, as ascertainable by the inspection of their Wells; and the state of Agriculture, and Population, being also mentioned, makes me hope that I shall not be blamed for not leaving out what I have said of Baron Humboldt, and also of the Campine of Brabant in the *Netherlands*, and the Abbé Man's remarks *upon the same;* and I need not apologize for what I have stated from Macculloch's work on the prevalence of Epizotic diseases appearing among Cattle, at the noted Seasons of Epidemic Fever among men, because I find in the " Sketch" circu-

* The Superintendent, a very intelligent Native, informs me that in the Canal beyond the Lake the trees were many of them very large, and were found in the greatest number about 30 miles beyond the Lake near Hoosinabad; many were very rotten, the rest were used for burning. Among them he recognized the Soondry, the Byen, the Gouah, and other forest trees; their trunks were of all sizes, and he supposes that along a line of 30 miles they were in number from 5 to 15 in a mile. As to the depth of such trees, those I saw in the nearer Circular Canal had their roots about or somewhat below the bottom of the Canal; and I saw a large tree, about the same depth, in a Tank digging on the borders of the Lake: the workmen said this was a Jack tree. —Aug. 29, 1837.

lated by the Board, that, that is a subject that should be inquired into by the Topographer. Indeed, I should have found a difficulty in making any alterations in my Papers.

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It will be seen in the accompanying Papers, I have alluded to Mr. Martin's paper on the Medical Topography of Calcutta and its Suburbs, but there is one part of it which I have omitted to refer to, but which, as *Surgeon to the Suburbs* and 24-Pergunnahs, I ought perhaps to notice. Mr. Martin suggests that the Police Surgeon should report upon the state of Habitations, Sewers, Streets, Roads, Tanks, &c. and that he "*should also report minutely on the state of the Suburbs.*" The late Dr. Vos, the then Police Surgeon, in whose opinion as to the necessity of Improvement in the Suburbs I fully concur, was accordingly called upon by Mr. Martin for his sentiments. Mr. Martin was not I believe, aware, that my duties as Surgeon to the Suburbs, had not only brought to my attention the importance of the subject, but had induced me, at an earlier period than the Date of his Papers, to make the repeated Reports detailed in the accompanying Papers. I merely allude to this, as any person reading only Mr. Martin's Papers, might be led to infer, from the suggestion to extend the duties of the Police Surgeon to the Suburbs, that the Surgeon of the Suburbs had omitted all notice of the obvious causes affecting the health of that portion of the District under his charge, whilst in reality it has not been for want of representation of their bad effects, that the various causes of unhealthiness in the Suburbs have been allowed to exist in their full vigour, and until as I am glad to observe, they have at last attracted the notice of other medical officers, besides myself. Finding that the printed Papers advocating the Fever-Hospital, &c. were in circulation, I forwarded to the Government the three first of the accompanying Papers, and that upon the effect of the Inundations, and I received from Mr. Mangles an answer, that my opinions would not be overlooked when the matters to which they relate came under the consideration of Government. I annex a copy of the Correspondence for your information.

The Fourth Paper, which I admit to be rather rambling and irregular in its character, was written, as far as I can recollect, in 1830, at the request of the late Captain Herbert; and is in continuation of some Papers I had already given him upon the same subject, but which had relation more particularly to the City and Native Town of Calcutta, also including the Lake and Soondurbuns; but Captain Herbert required further information respecting the Suburbs; the *filthy* state of them he thought was the more immediate cause of sickness here. He said he considered that in these parts there was not sufficient space to breathe, without inhaling disease, and that the luxurious growth of vegetation every where existing among the Huts and Villages, produced the Malarious atmosphere, which not only influenced the Suburbs, but extended its effects to the City. He intended to have published his opinions in his "Gleanings in Science," as remarks on the Malarial Topography of Calcutta and its neighbourhood. Indeed he had begun this Paper, and had considerably advanced in it, when his departure from the Presidency caused him to transfer the work to other hands, and he then gave up his Paper upon Malaria.

This Paper or Memorandum is copied from a rough paper intended simply as a skeleton for Capt. Herbert to build upon; loosely written as it is, it may not be irrelevant to the subject of Topography, as it contains some allusion to facts, which may not be altogether useless.

All the above Papers were written seven or eight years ago, but the next paper, or letter, which, although long, is a question altogether about Climate, was for the information of the Commissioner of the Districts contiguous to Calcutta; and in answer to an inquiry issued on the part of Government, endeavouring, if possible, to select the more healthy from the unhealthy Districts, with a view to send Prisoners who are banished, to those Districts that are found to be the most healthy. It will be seen in this letter, that

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I enter upon the subject with as much care and attention as I can command; the subject was a difficult one, and it was an answer to a Circular which was addressed to all the other Civil Surgeons as well as to the Magistrates; and the Commissioner informs me that my letter was the only one of all those he received, that he had forwarded to the Superior Court, the Sudder Nizamut Audawlut; and he said he did so, because he thought it contained a good deal of useful information; such being the case, I hope I shall be pardoned for forwarding it to you on this occasion.

Perhaps the health of Prisoners in a District may not be altogether a very bad criterion of the healthiness, or otherwise of a District. The question had reference to banished Prisoners; and those in the Allipore Jail being all banished Prisoners, and for life also, induced me to make a comparison of the mortality among them for a series of years. I found the average mortality little more than 5 per cent which considering that every man must die there, the proportion did not appear great. In Cities and other places, and departments, as in the Army with a regiment, or in other Services, men retire, become pensioned or otherwise quitting, leave the field for others, and do not remain to swell the mortality; but in this Jail, where men, many of them coming in advanced in age, are located for life, a larger mortality ought to be expected than among other bodies. I therefore come to the conclusion that it is healthily situated, and it will not appear inconsistent with my opinions, expressed in the former letter, as to the general causes of unhealthiness, because those causes are obviated in this particular case. The Jail is in an open space, clear of jungle, and these Prisoners are free to breathe good pure air in the absence of all jungle, filth, bad water, and other nuisances of which I complain, as affecting the Suburbs generally. The air is clear, and the Jail Tank probably the best of any, either in or near Calcutta; and I think it is an instance which goes to prove the correctness of the opinion of those who see sickness and death produced by Malaria where it is allowed to exist; as for instance, in the character of the disease and death which I allude to in the margin of my Second paper, in the case of Prince Sooroodeen, who allowed jungle to grow up to his very doors at Russapaglah, and whose continuance of life for several years was a source of surprise to myself. It may be that the quantity of Opium he took may, for a time, have counteracted the poison of Malaria which killed his only two sons when infants, and spread disease among his domestics. The Mr. Ward I allude to in the margin of the Memorandum for Captain Herbert, is another strong instance I would add in proof, and in addition to the facts and localities I point out in my earlier papers, I am sorry now to add another case to swell the list of mortality arising from the same cause. In all other respects, a most intelligent Native Doctor, who had been in my service for nearly twenty years, could not be made to understand that his continuance in his Family House at Bhowanipore, surrounded by Malaria, would be the death of him. I often so assured him, and took the greatest pains for a year or two, but all without effect; an old Jungle Piggery, inhabited by Chumars and Pigs, was the place of his residence, and his Diseases were first intermittent and remittent fever, dysentery, spleen, and he died dropsical.

The Allipore Jail I consider to be situated in the healthiest part of the Suburbs, and the whole of Allipore being, perhaps, somewhat higher, and better drained, or from the nature of its soil, which is sandy, does appear to me to have advantages over all the other Suburbs, if perhaps the open and airy part of Balleegunge be excepted. If I am rightly informed, the Inundations of 1833, which produced sickness in every house in Garden Reach, had not any serious effects either in the open parts of Balleegunge, or Allipore, while all the Inhabitants of the rest of the Suburbs were considerable sufferers, and great mortality was produced among the Native population of those parts.

The consequences of this flooding was felt even in the City, for by the Police reports the mortality in 1833 nearly doubled that of the preceding year, no doubt increased by

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the vast number of the 24-Pergunnahs sufferers, both rich and poor, flocking into the City, turned out of their habitations by the floods, and arriving also for medical aid, as I have remarked in my paper upon the subject, written just after the Inundation. The soil of Balleegunge I have found by the borings I have made there, to be very sandy, (indeed the place takes its name from *bálú*, or sand,) which is highly calculated to carry off, or absorb superfluous water; and I would here remark, that the Lands to the South-east, as far as Gurriah-haut, and very far beyond that place, are an open Plain, and are generally, with the exception of Garden cultivation, cultivated with Rice or Tobacco, to the extent of many miles, say twenty; and it is only here and there that Villages are to be seen, and these at a great distance from each other. It appears to me, and I wish to press it upon the minds of those who consider this subject, that the Malaria Calcutta has to complain of, is very greatly, although not entirely, in the surrounding crowded Villages, and more particularly those to the Eastward, between the Salt Lake and the Mahratta Ditch;—for, admitting, what now seems to be uncontradicted, that this Lake is highly productive of Malaria, the *Air* when the wind is Eastward of us, has to find its way to our City, only over Swamps, Jungles, and Villages—themselves highly productive of the same Malaria, and therefore not calculated to dispel the evil. The advantage enjoyed by Calcutta when the wind is South, is, that it passes over a large tract of country with very few villages; besides which there is the fine Maidan South of the City, to neutralize what Malaria it possibly may contain: a similar remark may be said to apply in some degree when the wind is in the North;—and on the West, the River is some safeguard;—but the Eastern is notoriously the bad wind, and I think here it is sufficiently accounted for.

Should the researches, now making, tend to a better knowledge of these facts, some attempts at improvement may commence. Very slow and gradual Improvements have, no doubt, been adopted by the few Europeans and others of intelligence, who have at different periods inhabited our Eastern Suburbs, so much so, that among Europeans, life is much more safe than it was half a century ago, when we know, from well authenticated records, that the mortality was frightfully great; and we find the Salt Water Lake recorded as the most prominent of the causes. Should cleanliness ever obtain in these Eastern Suburbs, and the Salt Lake become Drained and Cultivated, I entertain no doubt whatever of great healthiness being the result; and one great advantage attending the Drainage of the Lake would be, that the country between it and the City would immediately improve, become more valuable, and be the resort of a more respectable population.

However Malaria may be generated, there can be no doubt that it is produced most abundantly in all those parts of Bengal, which are not cleared of Jungle, Drained, and kept Clean. Within my recollection the Maidán south of our City, was more swampy, and covered with a coarser grass than it now is, and many parts of the Native Town, and Chowringhee, are much improved, broad Roads and Squares having been made; and it is quite obvious, to me, that Fevers and Diseases in general are by no means so common as when I commenced practice here. I am so certain on this point, that I will not waste time by entering into particulars. Further Drainage and more free Circulation of air will still farther improve the Public Health; and it is admitted on all hands, that attention and improvement in our City Drains is indispensible to effect the good desired.

Yet, I think we must look to the Improvement of the surrounding Suburbs, and Lands beyond, effectually to render this City as healthy as it can be made; and without attempting to investigate the chemical analysis of Malaria, or to describe what medical treatment should be adopted for diseases produced by this poison, I will endeavour to draw attention and point to the numerous causes existing all around us.

Let us look around us, and we find all the essentials necessary for the formation

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of Malaria ; beyond our City, Jungles, Lakes, Marshes, Gardens,—crowded with trees and woods of every description —Weeds, stagnant Water, filthy Pools, and low grass jungle of every kind, surrounding the Villagers' habitations. In these exist ample means for a constant supply of the Poison, assisted, as they are, by the natural heat and moisture of the climate ; but when unnatural or meteoric changes of climate take place, or when unnatural Inundations of Sea, or River water occur, then, as we should expect, we find Disease and Death scourge the land, as was instanced by the Inundation of 1833 in particular, and as shewn by all the other* Inundations also. Such excess of mortality is to be expected in Bengal when Inundations, or unusual moisture, followed by great heat, occur. As a common cause of the constant Malaria that prevails here, I would mention the *exposure of a vast expanse*† *of wet mud*‡ *on the receding of the tide from the Salt Water Lake*, and the banks of the numerous Rivers, and tide Harbours ;—it would not be difficult to enumerate more causes, but the above are sufficient. Within the City, among numerous other causes, we find Sewers and Drains sadly neglected, allowing their decomposed and decomposing animal, vegetable, and other substances, to sink into the earth, instead of Draining off as they should do into the River or the Circular Canal. Here perhaps in some particular state of the ground, the soil may be of a nature calculated to receive the poison, and it probably condenses and accumulates, forming, as it were, a permanent attachment to the spot, and for what we know, certain peculiar solid bodies, casually exposed to it, may receive it also. Whether the poison be produced by common putrefaction, or by any peculiar change in the elements of vegetable matter, dead or dying, it seems to be admitted that we know not its exact chemical character, though it is acknowledged that it is produced and propagated by Wet soils, Hot countries, a particular State of Atmosphere and high temperature ; and with this knowledge we do possess power to controul and check, to a very considerable degree, this extensive cause of mortality. We know by authentic records that it is but little more than a Century ago when London, from its then filthy state and bad drainage, was subject to very great mortality, and as civilization has advanced, the Countries as well as the Cities in Europe have also improved in Healthiness.

* Those of 1831, 1832, and 1834,

† The extent of the Lake is 18 Square Miles.

Dr. Bisset Hawkins describes in his work lately written on Medical Statistics, that

‡ Dr. Macculloch remarks, " How far mere mud, the apparent produce of the Sea, or left by the recess of the tide in Ports and Estuaries, and at the mouths, or on the banks of tide rivers, can or does produce Malaria, is one of the questions on the subject which has been argued on different sides. That such mud appertaining to fresh waters, and laid bare by the Summer heats, in Lakes, Pools, and Canals, does produce fevers, and of a very serious character, has been formerly shewn. "

And again,

" Or as it is the effect of tides in Estuaries under similar circumstances to reject and often therefore to expose the mud brought down by Rivers, it is plain that even without the presence of marine plants or their remains, such mud must often be in the same circumstances as that of Lakes in Summer. "

As to the River banks in America, we have the authority of Volney, the accuracy of whose observations can seldom be questioned, that every River in that Country, whether rapid or stagnant, produces Malaria and Fevers.

In France we have the authority of Mons. Falcon as to the pernicious character of Canals in France ; he enumerates them generally all through France as sources of Malaria. Indeed the opinion of a host of writers who have studied this subject, go to prove that the banks or margins of Rivers and Canals generally possess all the essential qualities of a marsh, as a diminution of the waters may *expose* mud *impregnated with vegetable matter*.

I have in these Papers given some instances of unhealthy localities from the above causes, and could, were it necessary, give more from personal observation and experience. That such confined spots, as muddy banks of Rivers and Estuaries, do not act far beyond their immediate limits, that they do not produce the same wide effects of disease as extensive marshy tracts, does not prove that they are not sources of Malaria.

17th September, 1837. *(Signed)* F. P. S.

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mortality has diminished in nearly the same degree, in which the prosperity of these countries has gradually increased. In England and Wales, for instance, the annual deaths were, in the Census of 1780, so numerous as 1 in 40. In 1801 they were 1 in 47. So in France (a more Malarial country it might have been remarked) the annual mortality was, in the year 1781, 1 in 29, and in 1802, 1 in 30. In London he considers that now, 1 person in 40 dies annually; while he gives the mortality of England and Wales, at the present time 1 in 60; a considerable improvement since the year 1780, when it was 1 in 40.—Doctor Hawkins gives the Mortality of various Continental Cities, and compares them with the country mortality, which it exceeds in every instance. He remarks that Mortality, or the Calculation of the Number of Deaths which occur in a Country or Town, has become an important object of research; and that Tables are formed in almost every Civilized State by direction of the Government, in order to ascertain the point.

In some Districts this amount is increased, or diminished in a slight degree, by direct, and by local causes; but, on the whole, it appears that the good or bad condition of a people, the possession of the necessaries of life, or their absence, mildness, or rigour of the mode of Government, the advance or retrogression of knowledge, are the principal circumstances which influence the result. The greatest difference of Mortality in City and Country, appears in Holland, where in Amsterdam the deaths were 1 in 24, while in the country it was 1 in 48. In the City of Naples 1 in 28, in the Country 1 in 35. In the City of Paris 1 in 32, in France 1 in 40. I may be allowed to quote Dr. Hawkins' concluding reasoning upon this important subject: "Life and Death, then, mainly depend upon the *prosperity* of the circumstances which surround us: physical prosperity and moral happiness, which often depend, and re-act upon each other, present a safeguard at every crisis of existence, both to individuals and to nations. We may often judge with tolerable accuracy of the mortality which is likely to exist in any given Country, Town, or Hospital, from the degree in which poverty or wealth, knowledge or ignorance, misfortune or success, are seen to prevail; wherever want and *misery* exist, there the mother is more likely to die in labour; there still-births will be more frequent; there the deaths during infancy will be more numerous; there epidemics will rage more violently; there the recoveries from disease will be more tedious, and the fatal termination of it more probable; and there also will death usually approach at an earlier period of life than in happier situations." It will be seen in the Statistical Account of the British Empire, just published by J. R. Macculloch, Esq., under the head of "Vital Statistics," that between the years 1813 and 1830, he calculates the annual mortality in London at 2.84 per cent. and for six *Towns* in England for the same number of years as at 2.95, and he estimates the mortality at Glasgow between the years 1821 and 1835 at 2.83 per cent., whilst he gives a detail of Wales and forty Counties, shewing in every instance a considerable decrease of mortality as compared with London, Glasgow, and the six Towns above cited. The above mentioned book has numerous tables upon points of mortality, and contains other information upon the same subject of great interest.

With regard to this part of India, I mean to confine myself to Bengal. I think the reverse of what occurs in Europe as to mortality will be shewn, when we obtain Statistical Reports that can be relied upon; and whatever may be the healthiness, or otherwise, of the other Bengal Cities, I expect it will be found, that in Calcutta there is less mortality than elsewhere generally in Bengal, though it cannot be expected that we should shew so small a mortality as exists in the City of London, or the other European Cities.

In England and Wales the poor are taken care of in Workhouses, and the sick poor receive good medical and surgical advice and attendance in Hospital; but in India, where the knowledge of medicine, and the healing art is the same as it was many centuries ago; where in place of a sympathetic feeling for his fellow-man, there not only prevails an

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apathy in the Indian character, but where a division of caste prevents the agency of good-will and assistance of one towards another; where insufficient clothing, bad food, bathing at improper times, and the practice of fasting for long periods, (adopted both by Musalmáns and Hindus,) and where the Hindu ceremony of Antarjalí, which is so general,—taking the sick to expedite their death upon the muddy bank of the Ganges—prevails; added to all this, the want of advance in civilization and knowledge, and taking into view the extensive sources of Malaria so much dwelt upon, the existence of which I conceive, must, in a great measure, proceed from the want of knowledge and advancement in intelligence above alluded to, we must naturally expect to find a greater mortality here than in Europe.

The housing and habits of the Bengális which I have attempted to describe in the 9th paragraph of my letter to the Medical Board, dated March 21st 1835, all seem to have a tendency to deteriorate and shorten life. The Diseases of Bengal are nearly all produced by Malaria, and bear a very strong analogy in character to the Diseases formerly prevailing in European Cities and Countries, in times more uncivilized than the present. Sydenham, speaking of those times, says, Cholera comes almost as constant at the close of Summer, and towards the beginning of Spring, as Cookows towards Midsummer. He closes an accurate description, by remarking, that it "often destroyed the patient in 24 hours." Dr. Craigie has demonstrated the antiquity and identity of Cholera all over the world. The description and remedy for Cholera, (taken from the work of Hermannas Vander Heyden, a physician of Ghent, dated 1653,) published in the 1st vol. of the *Gleanings in Science*, I myself sent to the author in 1829. The remedy, as far as the opium and *Henbane*, *Hyoscyamus*, or the *Khorásání ajwayán* is concerned, I can speak of myself most favourably, from extensive experience. The author remarks, that the taking of it (the remedy) is not to be deferred so long, as that the patient is fallen into convulsive fits, and his *excrements* are of the *colour of Whey, which are evident signs that nature is spent in him*, for then it must be taken with *all speed*, &c. Fevers, remittent, intermittent, and anomalous, with Cholera, Diarrhœa and Dysentery, Spleen, and all the Nervous disorders under the head of *Neuralgia*, are the prevailing diseases both among the rich as well as the poor Natives of this Country. We find the Baboo of both Calcutta and the Mufassal passing through a life of disease and misery, and dying early in life, somewhat similar to our European Barons of old, who are said seldom to have attained to an advanced age, the filthy moats surrounding their Castles being supposed to have been the main cause; so here, I have often had occasion to remark, in and about Houses of opulent Natives, causes sufficient for all the mischief alluded to.

In conclusion, I will add some Tables [See Papers marked A. 13. to A. 15. inclusive,] of the Census of Calcutta lately taken, with the mortality of the Natives for the last five years, taken from the Police Books. Captain Birch began this year to procure the Births, so that in future a more correct estimate may be formed. The great difference in mortality between the Hindus and Musalmáns is striking,—while the difference to be observed between the Portuguese as compared with the English and the Eurasians is equally so.

Here is much room for speculation, and it cannot be said that as yet we have as good means of getting correct information upon this subject as they possess in Europe; nevertheless, we may approach as near as we can to the point we wish to ascertain, and we may hope to improve in such Statistical Records. If we are at all near the truth, the result seems to agree with the opinions formed by Dr. Hawkins in his conclusions and summing up upon the subject, just above referred to, and quoted. The Portuguese, among whom so great a mortality is shewn, are a suffering race, greatly subject to the catalogue of complaints enumerated in these papers,—while the English and Eurasians are far more prosperous in life, and enjoy comforts and happiness in a very high degree, as compared with the former

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section of society: the mortality of the latter is 3½ per cent per annum, while that of the former being 12¼ per cent, is very great. In 1830, I ascertained and published in the "Gleanings in Science" the burials in Calcutta of Protestant Christians from the year 1820, to shew at that time, that although the European population must have greatly increased, yet that the deaths and burials had not increased; and now that the same population is acknowledged to have increased very materially indeed, yet we see, upon referring to the first column of one of the tables, giving the Protestant burials for the last 20 years, no increase of Deaths. The years 1833-4, the two years following the Sea Inundations, shew the greatest mortality of late years; while among the Native population those two years shew an extraordinary mortality. The two last years shew, that in both European and Native population healthiness is restored. The mortality among the other columns of Sections of Society, the Catholic, Greek, Armenians, Hindus, Armenians, and Native Christians, are for the last 20 years, and I believe them to be nearly correct. The Chinese and the Jews keep no account of their burials, I of course could not include them—and they form a small portion of Society in this City. The Census is the one last taken by Captain Birch, and he took great pains to make it as correct as possible. You will observe by one of the letters annexed, that, upon the receipt of your Circular, I addressed the Magistrate of the 24-Pergunnahs, requesting a Census of the Zillah, together with the Mortality; and you will see his obliging answer to the same: the Census I send is only of the Suburb Division, which forms only a part of the District.

I have, &c.

(Signed) F. P. STRONG,
Surgeon to 24-Pergunnahs.

August 29, 1837.

Appendix to the foregoing Letter.

I find I have omitted in the foregoing Letter to notice what has been done at different times in the Suburbs of Calcutta, when Cholera has been scourging those parts, and carrying off all its victims who could not obtain, or who declined, medical aid.

It is but justice to the Native Doctors who are permanently appointed to the different Gangs of Prisoners on the Suburban roads, as well as the Native Doctors attached to the Mysore Princes, that I should state how eminently successful they have been in saving Life under these dreadful circumstances, and this has been a work they have at such times performed, independent of their actual duties. I think I may say that, taking the average of several years, the mortality among Villagers has not been more than 6 per cent. of those attacked with Cholera, where the above mentioned Doctors, and others appointed temporarily to assist on urgent occasions, were called to the patient in the early stage of the disease; and the average of the last sixteen years gives a proportion of 6⅜ per cent. among the Prisoners attacked with Cholera at this Sudder Station. A like favorable result attended the Native Doctors appointed at Bombay, when the Cholera became epidemic in that place, and Dr. Ogilvy, the then Secretary to the Medical Board of that Presidency, remarks that it was not ascertained that any case of cholera *had recovered* in which medicine had *not* been administered. 1204 fatal cases of Cholera were reported by the Bombay Police, in none of which cases had Medicine been given. Should this be the case in all situations among the poorer Natives of India when Cholera prevails, might it not be considered as a highly to be desired act of benevolence on the part of Government, that Native Doctors should be permanently fixed at different points? Say one, or two, with a supply of Medicine at each Thannah,

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immediately to render assistance in case of any illness, whether fever, or otherwise, for although it is possible, that every case of Cholera reported as such, may possibly not be actual Cholera, yet it probably may be a formidable disease, and would be immediately relieved; while Fever, Dysentery, &c. would receive a check, and most cases of Cholera would be cured at once. The subject is an important one, and probably much better plans than those I have suggested may be put forward by others, and adopted by the Government. I would only here remark, that such remedial measures may be the means of preventing much serious disease, and to a certain extent, preclude the necessity of Native Hospitals. The Natives themselves seem to have a great objection to quitting their homes and mixing with different classes of their fellow-men.

It appears to me that, as a means of checking the progress of disease among the Natives of this country, some such plan would be found greatly to assist the grand preventive means, the subject of my Theme, the removal of Malaria.

In the Map of the 24-Pergunnahs, which I copied from the Map which Mr. John Masters lent me several years ago, will be seen the Roads and Tanks proposed by that gentleman to be made in the Eastern Suburbs marked in red ink, and it will be observed that this projected Improvement occupies at least half the ground between the Salt Water Lake and the Mahratta Ditch. The Improvements recommended by the Entally Committee were more extensive.

No. VII. *b.*

A. 1.

On the Topography of Calcutta, the Suburbs, and the Salt Water Lake, and Soondurbuns beyond.—1828.

In and about Calcutta among the causes of unhealthiness, are the number of small dirty Tanks, and the large Drains from which the Water does not run off; examples of these may be seen in every direction, but particularly along the Circular Road, the Boitakanah Road, and the Roads in and about Entally and Sealdah. To these may be added the numerous Holes or Tanks of Shallow water which fill in the Rains, and stagnate in the Dry weather. To remove these causes of Malaria, it would appear necessary that the Drains should be kept in a clear state, so that the water should run off at once; and as to the Holes or small Tanks they should be filled up.

On looking at the Map it will be seen, that there is a great deficiency of *Public large Tanks* all along the Circular Road*, and if Tanks of a considerable size were dug there, the

* As regards the deficiency of public Tanks, I am glad to be able to add the following as a Presentment of the Grand Jury to the Judge, signed by the Foreman, on behalf of himself and the other Jurors only the other day,

"That the Native Inhabitants of Calcutta are, during the Hot Season, most distressed for want of a proper supply of Water for Domestic purposes, and for the extinction of Fires; and that there ought to be at least *Six new Tanks of water* dug on the Calcutta side of the Circular Road, and the aqueduct from the Engine at the Chandpaul Ghaut ought to be carried to each of the said proposed Tanks, and also to the several public Tanks now being on the line of road from Sâm Bazâr to Park Street, in order that the said several Tanks may be supplied with Water from the River, &c. &c. *August 25th 1837.*"

soil from them might be used in filling up innumerable Holes and Tanks, and also many Ditches, which are perhaps of an unnecessary depth and width. A plan something like this, Dr. Martin tells me, was adopted near the Body Guard Lines and his Hospital,* with great good effect in lessening the number of sick sipáhís in Hospital. To these causes may be added the great quantity of Trees and Jungle to the Eastward of Calcutta, and indeed throughout the Suburbs, and even in many parts of Calcutta itself; much of this exists in the private Gardens and Compounds of individuals, and is, I imagine, as great a nuisance as it is in Towns in England to exercise any unwholesome trade to the detriment of the health of the Inhabitants; and as such nuisances can there be put down, so ought the nuisance of overgrown Jungle here to be capable of being removed. Much probably arises from neglect, and would be removed without any coercion; example might induce some to remove the nuisance, but there might be others, who might require a stronger stimulus than either example or their own benefit. To meet this, perhaps a Regulation, if necessary, might be framed by Government, which I should think would not be a matter of much difficulty as far as regards the Town, and for the Suburbs I should hope there would be no difficulty. In the Native part of the Town, the *stench* of the Drains and stagnation of the Tanks is a sad grievance. In these *filthy* stagnant small Tanks or Puddles, numerous Natives bathe; and in these you may see filth of every kind; and I can point to such which produce *sickness* and *death* to those who live close to them. The filling up of those

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* Mr. Martin in a printed paper on the Medical Topography of Calcutta and its Suburbs in 1834, gives a further account of the Body-Guard Hospital, and Improvements the Government adopted at his suggestion. He says, the result during the three following years, was a reduction in the frequency and intensity of fever, as remarkable as it was satisfactory. In speaking of the different Villages he says, that one description will serve for all; viz. general irregularity of ground, affording lodgments of various extents for stagnant waters, now very offensive; Drainage every where defective, and good Tank-water scarce. There are also belts of Jungle trees and underwood, obstructing ventilation. In all these villages the replies of the Natives confirmed, what indeed any one could have predicted, as to the general prevalence of remittent and intermittent fevers; he adds, it may be said with truth, that of all the places noticed, there are not six square acres of soil occupied by Natives which do not contain marsh, and other concentrated sources of periodic fevers, which in the course of time establish their inevitable sequelæ of spleen, and fatal diarrhœa—the brief history of the life and death of two-thirds of all the poor Inhabitants around us.

I do most cordially agree in sentiment with Mr. Martin, that, without attention to the state of the Suburbs in the first instance, it is useless to attempt any great improvement within the City, and he considers that for one case of Fever within the City, there are two beyond the Maharatta Ditch. I allude to Mr. Martin's observations and sentiments on these subjects, as confirming those which I had previously expressed in my own papers on the same subjects; and I may add, that the late Doctor Vos in his letter to Mr. Martin's address, says—"The Suburbs require much Improvement, and as long as this object is unaccomplished Calcutta cannot be healthy, it being surrounded with Jungle on all sides except the River. The Suburbs of Calcutta are full of dirty pools, and no sufficiently large Tanks." And he alludes to the continual sickness in most families, except those who live in Upper-roomed houses.

With the same view, I also refer to the observations made by Bábu Ramcomul Sen and Dr. Jackson, to Mr. Martin's address, who remark that the particular causes of fever are:—

1st. Want of Tanks in different parts of the Native Town to supply wholesome water for drinking.

2nd. Accumulation of Filth and stagnant water.

3rd. Shallow Tanks, with Unwholesome water.

4th. Digging Pits and Holes, and leaving them open.

5th. Drains.

And it is further remarked—in the Suburbs of Calcutta the Drains are badly kept, water does not find its free passage in them, and amongst crowded gardens, full of marshy places surrounded by Jungle, the free circulation of air is prevented, while the decayed leaves and vegetable substances thrown into the stagnant water create Malaria, and produce Fever; and it is added, that few of the labourers, peasants, and poorer class of people living in the Suburbs, escape its effects; and even the higher class of people are attacked with it, and a large portion of them fall victims to it. *August 29th, 1837.*

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Holes and making large Public Tanks would be of essential benefit as regards Cleanliness and Health.* Almost throughout the Native Town the Drains are generally of a bad kind, and as regards Drains, the Steam-engine,† now about to be erected at the Bágh-bazár, to water the central Chitpore road, might be made available to fill Reservoirs that might once a day, or probably twice, cleanse the Drains; or it might be desirable to erect more powerful Steam-engines for such purpose generally throughout the Presidency. The filth of every kind found in most of the cross and small roads in the Native Town is a great evil added to the rest, and if the Chokidárs, or those empowered, would oblige the Baboos, and those in large houses, to remove away their nuisance, it would be desirable—Regulation of 1814, enforces this.

The Tatties generally throughout the Native Town of Calcutta and Chowringhee, are much complained of in all directions; and situations of extreme nuisance on this account, are frequently pointed out to me. I have found in the Insane Hospital the advantage of sinking this nuisance into deep wells‡, but improvements of this sort, and of so extensive a nature, would rather belong to a scientific Surveyor than to a Medical man, whose province it may more immediately be to point out these various sources of pestiferous atmosphere, and the same remark equally applies to the general Draining of Calcutta.

It is not easy to point out what this Miasma or Malaria is, but the state of the soil has much to do with it; it is known to be formed in Marshy or Undrained spots, in Wet Woods, and in Moist Meadows; and the low and dense brushwood Jungle or thickets of reed or grass, so common in India, being the residence of moisture and decaying vegetation is analogous to Marsh land, and must produce much; but it is well known that Indian Fevers are caught also in Forests, such as the Turraie forest, and many others, but particularly in a most dangerous one near Hoosunabad, and one above Bareilly.

I conceive then, that putting out of question the Soondurbuns, and the *Salt Water Lake*, that the Thickets of trees and Jungle, Weeds, Pools, small Stagnant tanks, and Jheels, which every where abound on each side of the road, down from Chowringhee, Brejeetullah, to the end of Russapaglah, on each side of the Kalighat road on to Tolly's bridge, on each side of Tolly's Nullah, and the road on the right of this Nullah as far as the Insane Hospital, where the eye can hardly find any equality of surface except on the Jheels and Tanks, and where the wild Indigo and *noxious weeds* are growing in all directions—all this being situated South of the Presidency, must be a constant source of disease and disorders, many of which would vanish, if this pestilence could be removed. And if I am not mistaken, I can trace illness from this very source (these weeds, &c.) to certain houses in Chowringhee, where in occasionally uninhabited houses, in the compound, and round the Tanks is to be found Jungle indeed,—which must add greatly to the Malaria which is blown from the Russapaglah Jungles over the Chowringhee part of the Presidency. I have *as yet* excepted the *Salt Water Lake* and Soondurbuns, to confine myself to *Calcutta* and its *Suburbs;* but considering the general healthiness of this Presidency, they cannot be well excluded, and they have been always considered as conducing to the general unhealthiness of the place, the wind coming over such an expanse of *Jungle* and *marsh.* The experience of medical practitioners here confirm this opinion, for it will be generally found, that where easterly winds prevail for some days together a greater degree

* One good-sized Tank has since been made in the Native Town. *August 29th*, 1837.

† A considerable sum was subscribed for this purpose, but the plan was not adopted, the interest of the money being expended in watering the Chitpore road. *August* 1837.

‡ The same plan has since been adopted in the Jail Hospital at Allipore. *August* 1837.

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of sickness is common. To inform myself, as well as I can, regarding the Lake, I have been through it as far as Tarda, and frequently visited its borders by the several roads leading up to it from the Circular Road; the further half of what appears in the Map as Lake, is now a continued low Soondurbun Jungle from Bamanghatta to Tarda, intersected by channels; and the same kind of thick low Jungle is continued round from Tarda to near the lands adjoining Gurria-haut, on Tolly's Nullah. From inquiries I have made I understand that the water in what is called the Lake, but which may more properly be considered as a mere shallow Marsh, is generally not much more than knee-deep, and it is in many places of even less than that depth. The appearance of grass and bushes growing in the water, shews that it cannot be of any considerable depth, and I am inclined to believe, that the depth of the water generally throughout the Lake, is, with the exception of the Navigable Channel through it, not of greater depth than what I have just mentioned. The water is brackish, but becomes more salt as you proceed from Balliaghat towards Bamanghatta, along the navigable channel which runs through the Lake to that place. No one can doubt that a shallow* brackish or Salt Marsh, extending, as the one in question does, over a surface of many miles,† must be a source of much unhealthiness, particularly in a tropical climate; and that it must produce a contaminated atmosphere, the bad qualities of which must affect the health, not only of those inhabiting its immediate borders, but also those residing in the neighbourhood for miles around it. That the neighbourhood of the Lake is really unhealthy,‡ I believe needs no proof; inquiry amongst the Natives of Balliaghat and other places, similarly situated, would satisfy any person in this respect. He would be told, "the air was very bad," that "the *Salt* air was very bad," and would find, that sickness in those places more than commonly prevails.

I have heard it said, that this Lake or Marsh was capable of being Drained, and the lands redeemed and brought into cultivation; moreover, that it would probably become valuable land for the cultivation of Indigo, Rice, and other products. The question of Draining, however, is one which belongs more to the province of a Surveyor to decide, and upon which I am unable to form any correct opinion. The Channel which runs through the Lake from Balliaghat to Bamanghatta, is bordered on each side with grass and Jungle, and is the only part of the Lake which I understand is used for the purpose of Navigation, and this Channel is obliged to be kept open by means of Dredging Boats. On the borders of it, and indeed on other parts of the Lake, huts are occasionally to be seen, and Cattle grazing in the Jungle and grass in the water; here and there are to be met with lumps of earth above the water, and particularly *small ridges in some places along the edge of the Navigable Channel.* From these circumstances, and from what I have heard on the subject of Draining the Lake, I am rather inclined to think that something might be practicable in this respect, and I believe there are as yet no grounds for supposing it impossible to Drain off the water; or by Embankments, or some other means, to reduce the land, now waste and useless, and a source of disease, into profitable cultivation, and make it at least a comparatively healthy place. I believe that some land bordering upon the Lake, on the Calcutta side, and to a considerable extent,

* Marshes into which Sea-water occasionally enters, are observed to be more Pestilential than mere Fresh-water Swamps. Vide Dr. Traill's Medical Jurisprudence, page 68.—*August*, 1837

† Eighteen and a half square miles.

‡ Some years ago 16 Police peons were sent upon a particular duty to the borders of this Lake—every one of them became ill; as many more men were sent in their room, and these were all attacked with disease, and obliged to return.

My informant was Mr. Blaquiere, who saw these men. It has been said that if the Lake was converted into a rice cultivation, it would be as unhealthy as it now is. Quere. Would a double batch of men sent to a rice cultivation become thus diseased?

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has already, by means of Drains and Embankments been reduced from its marshy state, and either is, or will shortly be, in a state of cultivation; which is a proof, that industry may overcome any seeming difficulties; and that at least some parts of this Pestilential Marsh may be brought into a valuable state; and if the whole, or a considerable part was reduced into cultivation, even into Paddy or Rice lands, the situation would become much more healthy, and the whole neighbourhood, including Calcutta, would be much benefited by it. It is true, that as Paddy or Rice land it would still, at certain Seasons, be partially under water, as lands of that description generally are; but I do not think that such lands produce the *same unhealthy atmosphere as the present Salt and Jungle Marsh**

* *Annesley* on Soils and Situations productive of Miasmata, &c.

Page 55.—The copious extrication of unwholesome effluvia from *Salt Marshes* and partial Inundation of the Sea has been long admitted, and has only been disputed by one writer of eminence, who instances, in disproof of the position, the Salt Marshes of one particular District in the Western Hemisphere; but there it is probable that there was some peculiarity in the soil and its productions, which rendered the formation of Malaria impossible.

Page 56.—Experience will prove, &c. &c. when such Soils have been Inundated by the *Sea*, as from the breaking down of Embankments, &c. the formation of deleterious effluvia has become most abundant, and has been the source of a most devastating pestilence. In proof of this, we may mention the noxious situations and *Salt Marshes* at the mouth of the *Ganges*, the *Irrawaddy*, and the *Indus*, and numerous other places in the East. In the North of Holland the fever which was so destructive in 1826, was a very strong proof of the deleterious effect of *Salt Water*.(1)

Page 57.—The effects resulting from the Inundation of the *Ocean* are not perhaps referrible so much to the circumstance of a small quantity of Salt proving a septic, as is supposed by many, for it seems evident the antiseptic properties of Salt are in proportion to its quantity, and that a small portion will not have a septic tendency, because a large one has an opposite effect. The subject has not received its desired attention; and authors have, in respect to it, been more prone to copy the suppositions and admissions of their predecessors than to examine into the grounds upon which the opinion is founded. *That Sea-water, mixed with Fresh-water and vegetable matter in a state of decay, will increase the generation of effluvia* under the influence of a powerful *Sun*, and render them more concentrated, SEEMS TO BE THE FACT. It has been *repeatedly* presented to *our notice*, and is supported by the *testimony of the majority of observers*. But this result seems to be owing to the quantity of *animal* matter Sea-water contains, which occasions it to *run faster* into putrefaction than Fresh water, when subjected to a *warm temperature, and kept at rest*. Much is owing to the lowness of the situations where Inundations take place, and the quantity of vegetable and animal matter in a state of decay which such situations contain. The exhalations proceeding from these places, whether within the Tropics or in temperate regions, during warm Seasons, are generally more noxious during very moist states of the air, a condition always present in warm climates; and they are still more particularly *hurtful, when* they have been collecting for a considerable time, owing to the continuation of calm weather, and the absence of thunder storms, or those more violent atmospheric vicissitudes which are so beneficial in sweeping away the exhalations accumulated in low and narrow ravines, and among the *thick underwood of Tropical regions*.—*August*, 1837.

(1) " The Epidemic which prevailed in Holland, and particularly in Groningen and its vicinity during the summer and autumn of 1826, seems to have been owing to the partial Inundations of the country by the *Sea* during the preceding winter and spring. Through Friesland, and particularly in the Town of Sneeck, observes Mr. Kerchoff, (Journal Complement, January, 1827,) this cause appears to have had a decided influence. Sneeck is a handsome and well-built Town, the Streets are broad—the population in 1825 was 6373, and the deaths were from 10 to 12, monthly. In the autumn of 1826 it became the centre of the epidemic which ravaged Friesland, and in July the deaths were 23, in August 87, in September 80, in October 127, and from the 1st to the 20th of November 62. The water in the fosses of this Town is generally limpid and running, and that which usually fills the adjoining ponds and lakes is equally pure, and suited to domestic purposes. But after the breaking down of the dykes in 1825, and the consequent Inundations, the water became Salt and brackish, and during the high and continued heat of the following spring and summer it became greenish, and so offensive, that the workmen could not labour in the vicinity without being seized with intermittents and remittents. As the summer and autumn advanced the fever assumed a remittent and even continued form, and the effluvia from the soil became more concentrated and noxious, as the waters were more completely Drained off by the continued warmth of the season. At the same time the bad water was used, without sufficient purification, for domestic purposes. These causes, although instanced here with respect to this particular place, were also present in equal force at Groningen and other places in Friesland; the fever which was at first intermittent, assumed a continued type, and, during the exacerbations, the pains of the back and head were increased. In the majority of cases the liver was much affected. In the months of August and September, the fever assumed the character usually presented by fevers in low and moist situations within the Tropics, the circumstances occasioning them being in every respect similar."—*August*, 1837.

now does, though they may do so in a comparatively small degree; the crop is cut down, and not allowed to rot on the ground, or in the water, as the Jungle does, and the land is clean for many months in the year. If by general Draining, Levelling, removing the neighbouring Jungle, and producing as much as possible a free current of air, the atmosphere we breathe shall be rendered purer, many lives may be saved, and many who are now obliged to leave the place, may be able to remain, and attend to their respective occupations.

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NOTE.—*The above Paper was written and given to the Governor General shortly after his Lordship had sent for me on the 2nd September*, 1828.

(Sd.) F. P. STRONG.

No. VII. *c.*

A. 2.

Continuation of the same subject—Allusion to the Soil around Calcutta—Sir H. East's opinion of the same, after one experimental boring Remarks on the bad effects of Marsh and Jungle air; allusion to cases and localities—Remarks on Cultivating the Soondurbuns, &c. —1829.

TO MAJOR BENSON, &c. &c.

SIR,

In continuation of some Papers which I had the honor to give some time since for the information of the Right Honorable the Governor General, regarding the healthiness of this Presidency and its Suburbs, I have the honor now to submit some further remarks on the same subject.

In my former statement I alluded generally to the various causes to which I was led to attribute much of the unhealthiness of this place, and amongst these were various nuisances, which I took the liberty of pointing out;—such as the great quantity of surrounding Jungle, the numerous small dirty Tanks, cavities, &c. and the general state of the Drainage. I have since gone further in my investigation. This, and practical observation, have more and more confirmed me in the opinion that I have always entertained relative to these several causes being productive of unhealthiness, by contaminating the atmosphere, and generating what is termed Malaria.

That I am not singular in my opinion of the bad effect of stagnant Drains, is evident (in addition to other authorities which could be produced), from a circumstance of late practical occurrence, which I beg leave to quote. It is what lately took place at Gibraltar, where extensive sickness had prevailed; a Dr. Wilson, who was there, speaks of the Augean Drains, and attributes the illness to Malaria. I have appended the short account he gives of it. If difficulties have existed in respect to Draining in Calcutta and its vicinity, I am inclined to suppose that they do not arise from the nature of the soil; and without feeling competent to give any opinion on the practicable part of improving the Drainage, I am not I think going too far in supposing that the new Canal, now being cut, would afford a great means for the Drainage of all that part of the Town to which it runs parallel. This great improvement is now rapidly going on. and viewing it merely in one point—that of the healthiness of the neighbourhood—we have only to look at the broad

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belt of Jungle that has been cut down for it, and the numerous small Tanks which have either been cut through or filled up, to be convinced of its great benefit. Besides commercial and other public advantages, this benefit and improvement would indeed be greatly extended, if the Canal was, instead of stopping at the present Eastern Canal, to be continued round the remaining part of Calcutta, and to join the Tolly's Nullah towards Bhowanypore or Allipore.

Considering that the nature of the soil might have much to do with the dampness and unhealthiness of this part of Bengal, and having for some time past taken opportunities of collecting various Peat earths that abound every where about these parts, I had examined the earth in several places, by boring with a machine to various depths, when my attention was called to the circumstance of Sir Edward Hyde East having, in 1814, made a boring 140 feet deep near the River, in search of a Spring of pure water; he, in a paper which he communicated to the Asiatic Society, remarks, that the different strata through which the borer penetrated have furnished the following observations :—

1st. " The primary object of getting at a Spring of fresh water entirely failed, of which sanguine expectations had been formed by the projector of the experiment, grounded, as it should seem, upon the common opinion that the soil of all the lower part of Bengal was particularly moist, and full of Springs; an opinion, which this experiment, if it can be taken as affording any criterion of the soil throughout the vicinity of Calcutta, has so far happily discountenanced. The first appearance of any damp was at the depth of 71 feet, in a reddish clay with a quarter of sand, and below 76 feet the earth was as dry as before, though the borer must have descended nearly to the level of the Sea, which, as the crow flies, cannot exceed 70 miles in distance, which the fall of the River, commonly computed at one inch a mile, is supposed to be according to its windings.

2nd. " The damp of the climate not being attributable to the moist nature of the soil, nor affected by it, otherwise than as an admixture of saltpetre in the soil may be supposed to have some influence on the exhalations from the surface, must be looked for, principally at least, from causes upon, or above the surface, to the want of a general system of Drainage in a level country, and the luxuriant vegetation, with inadequate openings through the woods for ventilation, which prevent or impede the copious falls of rain at the periodical season, and not unfrequently at other times, from running off properly. The heavy dews at other seasons are not probably more than sufficient to supply the daily exhaustion of the sun, and would rather contribute to the healthiness of the climate. All that seems wanting, therefore, is Surface Draining upon a general plan, and the cutting of broad strait Roads through the woods, as much as possible in the direction of the prevailing winds. The acknowledged improvement of the climate in and about Calcutta of late years, appears to be the natural result of the superior attention which has been paid by the Local Police to these two objects, the benefits of which will be extended with the extended application of the same means. "

Years before this Rennel had made similar observations; and since the period of Sir Edward East's remarks, considerable improvements have taken place,—though it is obvious that much yet remains to be done. I concur particularly in his observations about the Surface Draining, and the cutting of the Roads in the direction of the prevailing winds; and I may add, that in two of the borings which I have made at a considerable distance from each other, and one of which was in the New Canal, I have found that at about 70 feet from the upper surface, the yellow clay that was brought up was extremely tenacious and hard, after which water came up to the surface of the bottom of the Canal, but it was of a brackish nature. This circumstance tends further to prove the correctness of Sir Edward East's opinion as to the difficulty of meeting with a Spring of pure water, and argues, that if such is the general nature of the soil, in digging Tanks, no object is to be gained by

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making them of extraordinary depth, under the expectation of meeting with springs of fresh water, but that they must be considered rather as Reservoirs for rain water; and for that purpose, a considerable depth may be proper. But if at a certain depth, say at 60 or 70 feet, brackish water is generally found to exude from the earth, it might not be well to dig through the hard clay which is found to lie a considerable thickness above such brackish water. These investigations seem to prove that the soil hereabouts, which is unquestionably alluvial, does not contain so much moisture *below the immediate surface* as is generally supposed, and the *production of impure air* is most probably from the *surface* rather than from *below* the surface, though possibly in *other soils and climates* it may be otherwise; therefore if a system of Surface Draining, by open shallow Drains, were adopted, the advantages contemplated by Sir Edward East, might be obtained.

I take the liberty of alluding to considerable advantages obtained at Madras by the establishment of a Board of Health, and referring to the recorded opinion of the Justices of that Presidency, in their report at the last Quarter Sessions, of the utility of this Board, and of the improvements that had arisen from the attention of that Government to general points of clearance and cleanliness. If in that place, where they have the advantage of a Sea wind, such nuisances as these alluded to, are felt, it is fair to consider that they will be more felt here, where the vegetation is much more exuberant, and the population greater. I would here respectfully submit, that it is worthy of consideration whether similar proceedings to these of Justices in Quarter Sessions at Madras, might not here be attended with beneficial results, and also, whether a Board of Health at each of the large Districts, or Divisions under the Bengal Presidency, might not be beneficial. It might be composed of the Senior Military, Civil, and Medical officers; but should this not be deemed expedient, a Board or Committee of Health in the Presidency itself might be attended with incalculable advantages. When I first arrived in 1816, the South-east part of Chowringhee was covered with similar huts, and compounds to those alluded to at Madras; at that time I remarked certain well-built houses near those parts were uninhabitable, and the damp and evening mists about them were proverbial. Some time afterwards, those huts were all destroyed, several large Tanks were made, and the land generally levelled for the purpose of building good houses. Rawdon street, London street, Moira and Hungerford streets were finished, and I now observe the formerly unhealthy houses I have alluded to, occupied, and no longer considered dangerous to reside in.*

I alluded in my former paper to the very Jungly, neglected, and irregular state of the lands on each side of the Russapuglah road, leading from Birgetallah, Chowringhee, down to the place where the families of the Mysore Princes reside. I am every year borne out in forming the same opinion, and coming to the same conclusions I have there expressed, by my observation and attendance upon the Princes. I invariably find that when the wind blows over these Jungly and Swampy parts, towards their habitations, fever, and that often of the most virulent kind I have ever met with, prevails, and this more especially where the houses are low, or surrounded with marshy Swamp or Jungles, which is the case with several of them. There are some others, where the heads of the family have built their houses, three and four stories high, in the highest apartments of which they have their Zanána, and here they rarely suffer; but I know some lower-roomed houses, where the grounds are kept clean and airy, where they are also healthy, although perhaps not quite so much so, as in the higher houses. With the exception of accidents which occur now and then, and hydrocele, to which this family seem peculiarly liable, and which

* Huts are now rebuilding, and the place getting filthy.—*August 8th*, 1837.

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often requires operation and attention, I should consider the Princes generally healthy, their usual complaints being remittent and intermittent fever, and its consequences, such as spleen diseases, affections of the liver, and other visceral obstructions ; and although I think I am correct when I state, that since I have had Medical charge of these numerous families, now nearly nine years, I do not know of any one fatal case of cholera morbus, or one fatal case of small-pox having happened, (though these disorders have yearly carried off many in the adjoining villages;) but after the last rains I had a considerable number of spleen cases among them. I expect these families will now be tolerably healthy till the rains set in, when those in Jungly and damp situations must be expected again to suffer. I have mentioned this regarding the Princes, because the facts I think go far in confirmation of my main arguments, the unhealthiness of Jungle and Swamp.* It would be useless to enter into a detail of the particulars, which I could easily do, to prove the unhealthiness of numerous localities in and around Calcutta; one however I may allude to,—it is the case of the late Rev. Mr. Mosquito, a Roman Catholic clergyman, who lately went into a lower-roomed house at Siáldah in the Suburbs, which had a small compound covered ancle deep with dead leaves of trees, and close to this compound was a large tank, then filling up with stable straw and other filth. His fever was of the most virulent kind, and ended fatally last Friday the 17th instant. This particular cause of illness I believe, to be very common, which makes me thus anxious to bring it to the notice of the Right Honorable the Governor General, and I may be allowed briefly to mention, that I have visited many of the Villages bordering upon the Lake, and that I find the Inhabitants in point of appearance and health, to correspond very much with the state of those people who inhabit Malarial and Marshy lands in various parts of Europe and America, as pointed out by well-known authors. Since my remarks about what I had seen of the Lake I have been occasionally there, and I found that much of the land, which during the rains was covered with water, has since been dry, with Jungle growing upon parts of it; the tides have now risen higher than they were two months ago, and have covered at high water part of the land which had been left dry; these lands, being daily alternately wet and dry, must be a constant and plentiful source of Malaria, and fortunate indeed is it for the Inhabitants of Calcutta, that these Marshes are not situated South of it, instead of where they are. From the borings I have made in many parts of them, I should say that it would prove a most productive soil, fully equal to any about here. A moderate portion only of sand is met with, until you go to quite the other end of the Marshes, near Bamanghatta, where, more sand begins to appear. In parts where I bored deep, I found in my course the same charred, or peaty earth, to be found every where about Calcutta, and again below this a very tenacious yellow and slate-coloured clay. Of the existence of an ancient For[illegible]; all now covered by earth, there is no doubt whatever, as almost every where, about 20 feet deep, large timber trees are found in a state more or less of decomposition, but the superfices of the Salt Marshes, and down to 12 feet, is certainly composed of an earth well calculated for embankment.†

* Since writing this, Prince Soorooroodeen has been carried off by diseases, I believe entirely produced by the filthy state of his habitation—he allowed the most noxious Jungle to grow all round his house up to the very doors and windows. I could not prevail upon him to remove this, and I have taken several gentlemen to the spot to shew them what a magazine of Malaria existed, and how wonderful it was that life could be preserved within it. His diseases were fever, neuralgia, latterly partial insanity, and he died in an apoplectic fit.—*August*, 1827.

† Since writing this, an embankment has been made permanent on the Western side of the Navigable Channel, nearly half across the Lake as far as the Byamcarl, the lands, beyond are tolerably high, filled with Jungle.—*August*, 1827.

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These remarks bring me to the Jungle and Waste Lands beyond the Lake, and to the foregoing observations, I hope I may be allowed to add a few remarks on the subject of Cultivation. From all the information I have obtained, I am led to believe, that these *Waste Lands in the Soondurbuns are capable of being made to produce a variety of crops.** Some Coffee plants which I gave to a cultivator of Soondurbun lands last year and the year before, and which were planted out by him on the cleared lands, are, I am informed, in a thriving state; it may therefore be worthy of consideration, whether, if this plant is found to flourish, it does not hold out an additional encouragement to the clearing of these Jungle lands. I am aware that various opinions have existed respecting the cultivation of Coffee in this country, and that its success has been thought doubtful; several experiments have however succeeded, and the Coffee is considered of a fair quality. I have myself made the experiment to a small extent, and judging from the appearance of the plants in a piece of ground of about 10 acres, I have every reason to believe that the cultivation of Coffee here will ultimately succeed. I sent a thousand Coffee plants as far up the country as Moradabad, upwards of three years ago, and the last accounts I heard of them were very favorable. *Cotton* is perhaps another article that might be produced to a great extent in the Soondurbun lands. In an article in the Edinburgh Review, (No. 91, June, 1827, page 25,) *on the rise, progress, present state, and prospects of the British Cotton Manufactory,* it is stated, " that previously to 1790, the supply of raw Cotton for the British manufacture was principally derived from the West Indies and the Levant. But after the termination of the American War, Cotton began to be cultivated in Carolina and Georgia, and has succeeded so well, that it now forms one of the most valuable productions of the United States. American Cotton is generally known by the name of *Sea-Island,* and Upland; the former is the finest Cotton imported into Britain. It grows on small sandy Islands contiguous to the shore, or on the low grounds bordering on the Sea. The Upland grows at a distance from the coast." This article was written before the late American tariff, which has naturally led to discussion upon the cultivation of Cotton, and it has been considered that it may be cultivated with great advantage in this country to almost any extent, and of a quality not perhaps inferior to that produced in any other part of the world.† From the description given in the Edinburgh Review of the kind of land on which the finest Cotton grows, it appears in some measure to *assimilate to the Soondurbun lands.* I am told that the Bourbon Cotton grows well at Diamond Harbour, and previous to the last rains, I had some rows of the Bourbon cotton trees in a garden raised from the seed, and thriving abundantly, but during the rains they were so very exuberant that I cut them down; two or three only were left, and although entirely neglected, and most of their branches cut, they soon came into blossom and produced cotton, which I neglected taking care of, but I got from them quantities of seed, which I have given away.

From this trifling experiment however it is evident that the plants would thrive here, and it might perhaps be cultivated to a great extent in the low lands of the Soondurbuns. Should these lands become cleared, the cultivation of Sugar-cane on them may become an object of importance. It was observed by a Mr. William Fitzmorice, (who

* American cotton grown in these lands, and produced at the Agricultural Society, has been considered excellent.

† On the 20th of October, 1829, the Governor General expressed a desire to assist the Agricultural Society of India to promote the cultivation of superior Cotton and Tobacco, and the Court of Directors in 1831, sent out American Cotton Seed, and Government sanctioned an experiment at Akra in the Agricultural Society's ground, the particulars of which will be found in their report published in 1835. The Society also sent American seed to various parts of India, and the samples of cotton sent by several of the experimentalists were excellent. – *August,* 1837

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had been in the West Indies many years,) in a statement he made to the Honorable the Court of Directors, and which he printed in 1793: "That the more he saw of this luxuriant soil, the more he was convinced that they might annually import from Bengal any quantity of Sugar, and a proportionable quantity of Rum of a superior quality, without interfering in the smallest degree with the present cultivation and manufactories of Bengal. Indeed that the waste land occupied by the tigers, between this and Injella would produce nearly as much Sugar as the Island of Jamaica." Mr. Fitzmorice, from his printed work which I have, appears to have been practically acquainted with the cultivation and manufacture of Sugar, as it was carried on in the West Indies, and was therefore probably capable of forming a correct opinion on the subject, as well as on that of the cultivation of Coffee, of which he also wrote, but which Coffee cultivation has only (so far as I can learn) been attempted of late years, though the plant has long since been found to grow well in private gardens; much of this land to which Mr. Fitzmorice alludes, has since been brought into cultivation. Rice is, I believe, the principal crop, but of the vast tracts which remain in a state of waste Jungle on the East of the river Hoogly, and towards the Soondurbuns, much might no doubt be made productive, and if Sugar should be found to thrive on those lands, it is evident that it might be cultivated to a great extent.

You will oblige me by laying this paper before the Right Honorable the Governor General, at his Lordship's leisure.

(*Signed*) F. P. STRONG,
Surgeon to Suburbs of Calcutta.

April 23rd, 1829.

No. VII. *d.*

A. 3.

Continuation of the same subject—Boring for Artesian Springs advocated—Success in Europe of late years, giving the authorities—Further remarks on the Soondurbuns, with quotations from Baron Humboldt on the advantage of Civilization, and the Abbé Man on the healthiness produced in the Netherlands by Clearing, Cultivation, and Civilization.—1829.

To MAJOR BENSON, &c. &c.

SIR,

In the Papers which I had the honor to submit some time ago for the information of the Right Honorable the Governor General, I entered into an explanation of what I conceived to be some of the principal causes of unhealthiness in Calcutta, its neighbourhood, and the lower part of Bengal. In doing this I was naturally led to make some remarks upon those great sources of Malaria, or impure and unwholesome air, the Salt Water Lake, and the Jungly Soondurbuns adjoining; considering that the Draining of the one, and the Clearing of the other, would be a great Public benefit, if even done only with a view of removing such causes of Malaria, and consequent illness.

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In carrying into effect such measures, one most important *necessary* of life must be obtained, or else it is to be feared that any Improvements which may be attempted will proceed very slowly, and cannot ultimately be carried to a considerable extent. The article to which I allude, is a good and sufficiently abundant supply of fresh Water *fit* for drinking.

This is an article even much wanted in Calcutta itself, particularly during the dry and hot months; and much illness amongst the Natives has, and no doubt correctly, been attributed to their drinking *dirty*, *stagnant*, and *putrid* Water. The supply of *good* Water might, I am strongly inclined to hope, be much increased in and about Calcutta, and that by the simple, speedy, and comparatively trifling expensive plan of boring;* should this plan be tried and found to succeed here, it might probably meet with similar success if tried upon any of the cleared lands, or upon the Salt Water Lake, when Drained.

My hopes of success are in a great degree grounded upon the examples of boring which have taken place in England, where this mode of obtaining a good and constant supply of fresh water has lately been much resorted to, and has met with the greatest success, not only in London and its neighbourhood, but in the lower parts of Lincoln, Kent, and other fenny Districts.† In some of these, where the Inhabitants and their Cattle suffered much from the want of good water, the evil has lately been removed, where this essential necessary of life has been supplied by means of perforations made to a great depth in the soil by boring with an iron auger, so as to reach and bring to the surface the deep seated springs.‡ To some of the instances I beg leave to refer. Borings which have been made from 200 to 400 feet deep, have been found to cast up from 15 to 20 gallons of soft and remarkably pure water per minute, which without the use of Engine or Pump will rise from 20 to 30 feet above the surface up a tube or guide-pipe.§ Wells have been bored at Tooting, Mitcham, and *Merton*, in Surrey;|| one at *Merton* is said to cast up 200 GALLONS of water a minute,¶ and one at Tooting nearly 100 gallons. At Leeds 100 yards deep has been bored for water, and cast-iron Pipes used for conducting it.** Some partially unsuccessful experiments have been made in chalk.††

* From M. Arago's work on Artesian Springs, 1834-5.

Issues from principal Fountains

St. André nearly two tons per minute.
Bages, 333 gallons per minute.
Tours, 237 ditto ditto.
Merton, 200 ditto ditto.
Rivesalte, 176 ditto ditto.
Lillers, 155 ditto ditto.

Depths bored.

St. Nicholas d'Ailermont through 7 sheets of water 1,030 feet
Geneva, 682 ditto.
Suresne, 663 ditto
Chiswick, 582 ditto.
Bethune, 461 ditto.
1831 M. Champaiscan, 275 ditto

† Edinburgh New Philosophical Journal, December 1828, p. 170

‡ Mechanics' Magazine, vol. i. p. 293.

§ Ditto, vol ii p. 31.

|| Since my writing this, M Arago has particularly alluded to *this* boring.

¶ Mechanics' Magazine, vol. ii. p. 60.

** Ditto, p. 382.

†† Since this, several successful operations have been performed in chalk.

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But water has been obtained at Sittingbourne, in Kent (in which neighbourhood it may be remarked, that the land is level and low) after boring 336 feet. In Bedfordshire 400 feet, and in Surrey near Dorking, 440 feet in depth have been bored and water obtained.* At Hammersmith, boring is said to have been much practised lately. The water obtained there, which was of a superior quality, and the supply regular, in some instances 200 or 300 gallons per hour, but in no case is it said to be less than 80 gallons per hour, and the depth bored has been from 300 to 380 feet before the water was found, after which it has run over different heights above the surface, according to the strength of the spring. In the Duke of Buccleugh's grounds at Richmond Hill,† (where an excellent apparatus for perforating the different strata of the earth is said to have been used,) after boring 252 feet, a supply of most excellent water has been obtained, yielding 13 gallons a minute, and rising, as in a Fountain, 24 feet above the surface of the earth. These examples not only shew to what extent boring for fresh water has been practised in England, but it will also be seen from them, that this method has been successfully tried in both high and low situations, and through various kinds of soil. I will also add a quotation from a work apparently of much practical utility. In Loudon's Encyclopædia of Agriculture,‡ p. 671, it is said there are "borings in Middlesex and Surrey which afford a continuous and abundant flow of water, equal to 8 gallons per minute. A very copious Fountain which rises twenty feet above the surface, has lately been obtained by the same means in the grounds of Ravenscroft Park, the seat of G. Scott, Esq. near Hammersmith." Indeed there can be little doubt that in the majority of situations, not only in Britain but throughout the world, water might be found by boring or digging, down a few scores of feet. The expense in England, as mentioned in the same work, (p. 671,) is stated to be equal only to one-eighth that of well-digging, and it is remarked, that "the advantages of flowing springs of good water, which by these means may always be obtained on the sides of roads, and in a variety of other places where water is not at present found, are incalculable, the cost very small, and the operation easy and expeditious."

If the advantages are so incalculable, and so easily obtained in England, it must be obvious that they would not be less so in a Climate like India, and particularly in this part of the Country where they are so much needed, and where, although the water of the Hooghly, as far down as Calcutta, may be tolerably good, during most seasons of the year, and tolerably good water may be preserved in Tanks, yet the supply often becomes scanty, and when the Tanks are low, brackish and bad. Boring, if found successful, as I think it would be, is therefore a matter of more importance than it may at the first mention of it, appear to be. In the Fort, in particular, it might be found to afford that supply of water which all attempts to obtain have (I am told) hitherto proved unsuccessful and expensive, the wells being all brackish, and the Puckah-built Reservoir, made for the purpose of retaining a supply of rain water having, after repeated expensive repairs, been

* Mechanics' Magazine, vol. x pp. 230, 232, 258, 315, &c.

† Ditto ditto, vol. [illegible] p. 167

‡ In this work will also be found an interesting account of the mode of raising Lands near the River Humber by Warping, or letting in the River water, and allowing the warp or mud to settle. By this method Lands have been fertilized, and raised from 6 to 16 inches in the course of a year. An article also in the Mechanics' Magazine, vol. — p. 99, gives an account of this method of Warping Lands by the water of the River Ouse, and speaks of raising Lands near 3 feet in the course of a year. The water of the Hooghly containing a much larger portion of mud, might perhaps be applied to the same useful purpose of raising the Soil of the *Salt Water Lake*, or other neighbouring low Land.

found incapable of holding water, and its use for that purpose being therefore discontinued. Several borings for fresh water have also been made here, and amongst them, some in the Fort, and the only reason why they have not been successful is, I believe, on account of the inefficiency of the boring apparatus, and its not enabling those, who have made the attempts, to go sufficiently deep. In two borings made in the Fort in 1820, they were not able to penetrate deeper than 122½ and 128 feet. in both these attempts there was no indication of fresh water, but the earth brought up was occasionally damp and moistened with water of a saltish taste; a great deal of stiff clay was met with, and in both cases the *rods broke* and remained in the ground. The deepest boring I can find an account of, is that given by Sir H. East to the Asiatic Society in 1814, and that was 140 feet; no *fresh* water was found, and here the *rods broke* and were left in the ground: the only other accounts of any boring I can find was in 1804-5, and 6,—wells from 20 to 40 feet deep having all proved so brackish as to be unfit for drinking. These borings of 1804-5, and 6, which make four in all, were undertaken for fresh Springs. In the first of these Borings, after surface mould, sand, &c. the borer passed through hard clays with kunkur; it penetrated to 75 feet, when the water rose to the height of the water in the adjoining wells; it was analysed by Dr. Hunter, he considered it unwholesome, as containing a very large quantity of common salt, muriate of magnesia, and clay.

In the second the same sandy clays, kunkur and white and yellow sand, presented themselves at 70 feet: the borer was brackish at 81, and at 101 feet the rods came up nearly dry. A well of tiles had been made round the borer for the first 30 feet, and the water rose into it within 7 feet of the surface, fully four feet of the ground. At this place the ground was artificial above the general level of the country. During the whole dry season the water only subsided in this well 3 feet, and was on the 3rd June, 1805, only 10 feet below the surface, whilst the water in wells at a little distance was 30 feet below it. Here the lowest depth was 119 feet; coarse-grained sand was found, and the soil was very hard. *the borer broke*, and was not recovered. The third was in December, January, and February, 1805-6; similar earths were obtained as above, and from 114 to to 127 feet was found fine yellow sand, coarse sand, and very hard earth—here *the borer broke and* 91 *feet of rods were lost*. At 65 feet the water was brackish, but the deeper water rose to within 4 feet of the surface, and was well tasted. The fourth attempt was in March, April, and May, 1806. Similar earths presented, very hard, from 120 to 127½, yellow clay, sand and yellow sand; here the auger *was* partly *broken*, the edges were found sharpened like a knife. It was remarked that the water at 66 feet appeared tasteless, probably owing to the heavy rains that season in March, which had made the water in all the wells tolerable.

The late Mr. Jones, a person who was well known as having opened the Burdwan Coal Mines, made a boring, and found the same earth and clays, but he did not go beyond 70 feet deep; here he found kunkur, clay, and yellow sand, and he says at 70 feet—through a stratum of red coarse sand—issues a spring which is acted upon by the tides in the River. The borings I have made, have been comparatively trifling, for want of proper apparatus. I however bored down to 40 feet near the west margin of the Lake, where I found very stiff dark clay, and at the bottom some hard kunkur mixed with it.--As I mentioned in my last paper, I bored at the bottom of the Circular Canal, and found water at the depth of 70 feet from the upper surface, which rose 50 feet, and formed a Pond, which was banked in at the bottom of the Canal. This water appeared to me and my friends brackish, but on its first appearance the labourers drank it, and said it was good. At this place the clay, which is of great depth, and in parts beautifully yellow, and containing kunkur, was so very stiff, that at 50 feet, a large and strong auger was twisted in a most extraordi-

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nary manner, and two Europe-made strong Iron Hooks were broken in extracting the rods, which was done by means of a strong gin and windlass.

In a Garden in the Circular Road, about two miles from the above place, I bored through very stiff clay to 70 feet deep, and came to some kunkur, and I suspect other harder substance, which prevented my getting further, and I found the auger much scratched and polished.

At Russapaglah I could not penetrate deeper than 70 feet; at this depth I applied a smaller auger to the bottom of the larger rods, with a view to perforate where the large auger failed, but this broke, and was left 70 feet in the ground. In these borings I found myself much disturbed by the frequent falling in of sand from the upper strata, and I had not a cast-iron tube to prevent it: such will be necessary in any future borings, and a proper frame-work, and mechanical means for raising the rods will also be required.

I am told that there are in Fort William different sets of boring instruments sufficient to go a depth of 600 feet or more, and that they are of greater strength and excellence than those used in 1805 and 1820; but a gentleman who has lately arrived from England informs me, that a newly invented borer is now in general use, and much approved of.

Having given His Lordship a detail of the Plans which I respectfully suggest might be adopted to obtain a supply of fresh water, I also take the liberty of mentioning a few circumstances of information which I have picked up in the course of my inquiries relative to the Soondurbuns; as the circumstances tend to support the principle which I laid down in my former communication of the prevalence of Malaria in all Jungly, Marshy, and Ill-drained situations, and of its effect upon the Inhabitants of such places.

Baron Humboldt gives Tables to prove that in certain places the duration of life has been greatly prolonged by attention to cleanliness, improvements, and civilization. A little attention and inquiry will, I believe, go far to prove that there is much room for such change amongst the Natives of Bengal, but more particularly amongst the Inhabitants of the small and thinly scattered Villages in the Soondurbuns, who I am assured are a most wretched and short-lived people, continually suffering from poverty, and want of cleanliness and civilization, and from disorders produced by bad air generated in the Jungles surrounding them. Numerous inquiries I have made among intelligent Natives confirm this, and although gentlemen who have passed through the Soondurbuns may differ a little in this opinion, it is not to be supposed that their curiosity has led them to visit the villages in the interior, or to make inquiries of such a nature. An intelligent Native, who has much experience of the Soondurbuns in those lands considerably South of Tarda, has assured me repeatedly and most positively, that it is his belief that scarcely one in ten of the Villagers escape Fevers during the months of July, August, and September. The Villages he says, consist of 50, 100, or 200 people, including men, women, and children. They have their Native Doctors, but many die annually of Fever, and the spleen disease prevails very much among all, old and young; these opinions apply to the Inhabitants born and always living in these Jungles, whose constitutions are known to be more capable than others of resisting the poison of Malaria. The Darogahs, Chaprassies, and Servants employed by Government in the Salt Department* are sooner attacked, and when ill they always obtain leave to go to their homes. The Villagers are generally Salt Molungies, Wood-cutters, Boatmen, Fishermen; some shoot game, others collect wax and honey, and others spin and

* The Government having lately removed the Salt-works more to the Southward, has already been found beneficial to the more Northern Grantees, as the Salt Molungies have willingly become Agriculturists; and it will be seen in the Map that along the line of the new Navigation, running direct Eastward from the Lake, a very great deal of Jungle has been cleared away.—*August* 1837.

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make coarse cloth for the villagers. Of the little land at present cultivated, I am informed rice is the chief produce, and grain, cullie, and other vegetables grow about the villages, in all which there are Tanks: without a Tank, my informant assures me that no husbandman will settle to work, but wherever a tolerable Tank is made, that of itself will bring Inhabitants. I do not believe that any Europeans could live in the interior of the Soondurbuns as they now are—but were it possible to clear them by cutting down and cultivating from their external extremities, and go on gradually towards the interior, and if the land were well Drained, I see no reason why these parts should not be as healthy as any other place in Bengal. With regard to the external clearing, I allude more particularly to the thick and low Jungle bordering upon the Salt Water Lake, and which, from all I can learn, is more productive of Malaria than the forest Jungle towards the Sea. If I recollect right, I think Messrs. Schalch and Morrieson, when Surveying the Soondurbuns found it so; the latter in particular, as he had a predisposition to fever, and he found in the deep broad Rivers, where the timber trees around him were high, admitting wind, and where low Jungle did not prevail, that himself and his servants were well, but when he approached towards the Tarda low Jungles, himself and his attendants suffered. I have heard of one respectable country-born gentleman, who by clearing with great industry and assiduity an extensive tract of land beyond the lands I have been speaking of, fell a victim to Malaria. Another, who has cultivated and cleared a good deal of Jungle lands between this place and Tarda, is constantly suffering from fever, though he visits his grounds only one day at a time, and that only two or three times a month. He employed as an Overseer a healthy Portuguese, but he died of fever before he had been there two months.

I may here mention as regards fresh water, that this latter cultivator informs me, that, in March 1827, he dug a Tank on a high spot, in which he found a Spring perfectly pure, which filled a place walled in to retain the water about two feet high, and the water continued at the height, although the two adjoining settlements, and all the passengers, to the amount of some hundreds, went to this well daily, and if it did sink a little in the day it was sure to fill up the following morning. He made it into a Tank of 10 cottahs, and it continues to supply all the neighbourhood, who without this, would have to go a distance of 10 or 12 miles for Water. He also says, that near a Village called Narainpore, there is a fresh spring about three feet from the surface, but such was the idleness of the villagers, that they would not dig a Tank; and when he asked them why they did not prefer living upon the higher ground on the river side, they said, they were afraid of being plundered by the boatmen, which is a common occurrence, and he tells me that no Native Moodie or Merchant dares to settle any where except near a Company's Thannah. This individual says, that he finds very generally upon spots a little raised, a simul or cotton tree, which makes him think these parts were formerly inhabited; and the other gentleman found an old house. I believe also, that the remains of old Tanks are here and there to be found:* upon the whole, I have no doubt that if boring for water in these parts should be found inexpedient or inconvenient, that it can be collected and preserved in Tanks, at least as good as such water generally is about Calcutta, so that the want of water should not form an objection to the clearance, and ultimate cultivation of these Jungles, which are so close upon Calcutta. But the boring appears to me to be a preferable mode, as being cheaper, more expeditious, and, as by going to a much greater depth than can be gone in Tanks, the probability of getting pure water, and a constant supply is increased.

These Soondurbuns—unlike the Campine of Brabant, in the North of the Netherlands,

* Since this period about 1,00,000 biggahs have been cultivated, and in all directions the same proofs of former cultivation appears.

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which the Abbè Man states, "originally consisted of sand, covered with heath, interspersed with Lakes and extensive Marshes, and here and there with woods of fir, and which tradition reports to have been once a part of the Sea, and unlike the arid wastes in some parts of India,—are already fertilized in the highest degree by the decaying vegetation of years, and are, I respectfully conceive, calculated to produce a new and vast revenue to the State after a time, *and when a Scheme* shall be adopted that shall induce labourers to commence this work to a considerable extent*;† for it is not because the lands are barren that they are uncultivated, but chiefly because the air, now poisoned by the overgrown Jungle, is inimical to life, and every year's progress in the removal of this evil adds, in my humble opinion, most materially to the general health of the country. Even the poor Campine of Brabant, after partial failures, is now stated by the above cited author, to possess many extensive tracts well cultivated, and is covered with villages, well-built Houses and Churches. No doubt much of the country has been cultivated since the period at which Lord Cornwallis remarked, that he might with safety assert, that one-third of the Company's territory in Hindustan was a Jungle, inhabited only by wild beasts. We know of Jungle as near the Presidency as Sooksagar, under European management, having become invaluable land, but in the immense forest Jungles, and uncultivated tracts of Hindustan, it is not impossible that a field might be opened in which the Natives, and perhaps others, might raise for themselves an abundant supply of the necessaries of life; the field appears inexhaustible, and would be employment for thousands, while the cause of much disease and sickness (both among Mankind and Cattle), would be gradually diminished; for it is ascertained that in those years in which Malarial endemics and epidemics have prevailed, epizotic disorders have prevailed amongst Cattle Without going into ancient authority, a late writer, Dr. Macculloch, states it as a general fact, that Cattle or animals of differnt kinds do become sickly or diseased in the same situations which produce the diseases of Malaria in the human race, and that the consequences are as resembling, or analogous, as they could be under the differences which exist.‡ He states these facts to have shewn themselves in Egypt, in Hungary, in St. Domingo, and Gaudaloupe, as well as in France at Rochelle, and in Auvergne and Raussillan, and alludes to that particularly pointed out by Bailly, of the year 1812, at Arles, and adds that analogous observations haye been frequently made in Italy; and not to quote more than is necessary, the years 1711, 1738, 1745, 1772, 1783, and 1795, are among those which have been particularly recorded for epizotics among Cattle, each of them being also noted seasons of epidemic fever, or of the prevalence of Malaria; and that further they all occurred in the months of August, September, and October, and were also confined to the Marshy or unhealthy districts. I am acquainted with some Indigo Planters, who have remarked illness and mortality to prevail among Cattle in times when Cholera Morbus has scourged the land, and I doubt not that there are many persons in

* If the money expended in clearing and cultivating Saugor Island had been expended on Land South of the Lake, the result, I humbly conceive, would have been most advantageous to all the parties,—and quite different to the result of the Saugor Experiment; while Improvement and Healthiness East and South of Calcutta would greatly have increased.—*August* 1837.

† Grants were made in 1829 and 1830 to numerous persons about Attara Banka, to the extent of 500,000 biggahs, about one-tenth of which is now supposed to be in cultivation, in spite of the Agency failures and the dreadful Inundation in 1833; however, several Grantees have done nothing, and the five years having long expired the land is resumable by Government to give to others who will clear it. At this time, October 1836, several Pilots, who have cultivated several thousand biggahs near Attara Banka, expect as good a season as they had last year, which was highly satisfactory to them.

‡ Macculloch, p. 453. Although not noticed by Dr. M. another ancient author, Livy, remarks, that in the same years in which epidemic "*pestilences*" appeared among the people, there was also a great mortality among the Cattle.

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Bengal, who have remarked the same thing. I myself observed the same in the neighbourhood of Dacca some years ago.

The last year has been more healthy than any I have known,* and is the first year since I have been Surgeon of the Suburbs that I have not had an additional number of Native Doctors, 20 or 30, stationed at different posts with medicines and instructions to administer to every case as quickly as possible among the Natives, and I believe Calcutta itself has equally escaped the scourge this year; certainly Calcutta and the Entally Suburbs have been generally more healthy than usual. With my respectful apologies for the length of this paper, I conclude by alluding to one or two localities, particularly the Western end of the old Entally Canal, as being always in a filthy state. It was only early last week that I was called, in consultation with another medical gentleman, to see a child dangerously ill in the house exactly at this end of that Canal. My professional friend now informs me that the child is doing well. but that the father and mother have since been both seriously ill, that the latter was delirious, and for some days nearly dying, they have quitted the house; and such is the nuisance here, that a gentleman and his family have been obliged to quit the very next house to the one alluded to, which is only just behind the Marhatta Ditch, opposite the Dhurrumtollah. As the first step towards eradicating an evil, should be to ascertain its cause with as much certainty as the subject will allow, in order to judge of the capability of applying a remedy by its removal, so I have little doubt, that upon examination and inquiry, the causes of unhealthiness of particular situations in the Town and Country might be readily traced, and in most cases removed, without so much difficulty as might perhaps be expected. It is not to be wondered at, that particular parts of the country or the Town should be unhealthy, if in the one case they be covered with Jungle or Swamps, or in the other they abound with Nuisances which equally *contaminate* the air. Pure *Air*, as well as pure *Water*, is an indispensable *requisite* for Health, but it is impossible to look at the stagnant *pools* of water, the *dirty* ditches in the Native part of the Town, and particularly at the low ground within the Strand road, from where the Hindu bodies are burnt, almost up to the new Mint, which ground is in many places covered with stagnant filthy black water, into which stable dung and other filth is thrown to fill it up. and not to be convinced that such places must make all others near them more or less unhealthy, while there can scarcely be a reasonable doubt, that if these causes were removed, the air would be more pure, and the situations now affected by them equally healthy with the best parts of the Town.

23rd July. 1829.

No VII. *e.*

A. 4.

Topography of Suburbs generally, 1830.

Many localities have been pointed out to me as unhealthy, and the filthy state of the Músulman Burying-ground in the Circular Road, is considered particularly so, as making Cassiah Bagaun, very unhealthy; it is surrounded by broad ditches of stagnant water, filthy to an extreme degree. Different parts of Tiljullah and Entally are also well known as unhealthy, and certain particular houses are considered uninhabitable. A few years back a great number of poor were turned out of grounds† purchased by the

* In the early part of 1828, there was a good deal of fever in the Entally Suburbs for a short time

† Short-bazar grounds.

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Lottery Committee, and they built their huts in a particular part of the Eastern Suburbs,* on the other side of the Circular Road, surrounded by Jungle, and badly Drained; so great a number died of cholera, that it was found difficult to dispose of the dead bodies; this was after a sudden change of the weather, but these new Inhabitants, who had located upon a mere jheel, suffered much more than the Inhabitants of the surrounding neighbourhood. The small houses occupied by poor Europeans and Christians of colour, near and on the banks of the old Entally Nullah, are dreadfully unhealthy;† and people are constantly obliged to quit. Continuing along South of the old Nullah towards the Lake, there is a great proportion of ground entirely neglected and uncultivated, and this sort of ground is to be observed here and there, among garden ground, filled with high trees, the mangoe, jack, &c. and much of this in a filthy state; then you come upon low rice fields, and then the borders of the Lake appear. There are to be observed the remains of several old roads made by the late Mr. John Elliot, but most of these are so covered with Jungle, their ditches filled up, bridges broken, and the Jungle so impenetrable, that it is impossible to traverse them; the Eastern Suburbs I now allude to, must, at a former period, have been in a very superior state to what they are now, and there are several old brick houses, chiefly Native, and apparently deserted, which go to confirm this fact. In the South, towards Balleegunge, and near the rice fields, the grounds about the villages present numerous excavations of earth, taken for the purpose of brick-making;‡ these being left open, all sorts of nuisances collect in them, but more particularly the leaves of trees, and these decomposing with water and heat, must afford a rich production of Malaria. Still further South, Balleegunge is Jungly and badly Drained, and Bhowanipore and Russapaglah present a continuance of the same evils, many parts looking more like Soondurbuns, than Inhabited Villages.

Then going back, and looking to the North of the old Entally Canal, the same description applies, the same obliterated roads which formerly ran North and South in the direction of the winds, and which were broad and *once* had good ditches and bridges, all are now useless, and covered with Jungle, the habitation of jackals and snakes; and the same belt of Jungle and Villages is continued towards the Dum-Dum road.

This constant source of contaminated atmosphere all *round our City is sufficient to produce disease, however cleanly we may be within;* but *Calcutta itself,* has not much to boast of in that respect, although it is decidedly much more healthy than formerly, even within my recollection and practice here. The opening of Roads by the Lottery Committee over parts which I have often traversed when in their unimproved state, has evidently produced a healthiness and cleanliness before *unknown*, and this *fact* goes far to prove what *good* may be done by the *free* admission of the prevailing Winds, by Cleanliness, and by Surface Draining. In the City, and in the back lanes of Chowringhee, the Circular Road, &c. the Bazars, which have sprung up irregularly, have become an intolerable nuisance, which ought to be abated.

The Drains all about Colingah, and towards the Circular Road are bad generally,—currents of water meeting and running in all directions. Broad roads, with good Drains should be continued from the Circular Road in the direction of the plain,§ which is a Rice

* Marked on the Map *Curria*.

† Since this was written, a Mr. Ward, the senior clerk of the Sudder Board of Revenue, who I had often advised to quit his house, which was on the banks of this Nullah, has fallen a victim to Malaria. He was naturally a very healthy, stout, active, and strong man, when he went to reside on this spot.—*August* 18, 1837.

‡ I hear that there was formerly a Regulation which prevented Brick-making on this side of the River, and that formerly all the bricks were made on the other side of the Hooghly.

§ Formerly there was a very long ditch, which ran out far towards the Lake, but it is now nearly obliterated. This was brought to my notice by Captain Jenkins.

cultivation towards the Lake, and cross roads should be made at convenient distances; if such roads* were made, and the Jungle cut down, many persons with small incomes would be glad to build in these parts, more particularly about Entally and Tiljullah, from being so contiguous to Town, where many of such persons have offices to attend daily. Ballygunge is rather too far off for such people, and would appear to approximate to such places as Allipore, and Garden Reach, for gentlemen who can afford to have gardens and large compounds and out-houses. In all probability such new buildings in Entally and Tiljullah would be built upon an improved plan. If small houses, or indeed any houses, were built upon godowns, with apertures to keep such godowns well aired,† which might be used for servants, or to keep things in, would it not be better than the out-houses we now see, with the high compound walls surrounding every place, and which prevents the ingress and egress of air, and renders the air the inmates breathe more confined and foul? And if *Iron rails*‡ were more generally adopted in the place of the heavy compound walls with pompous gates, habitations would be much more airy. *Large Tanks* upon an improved plan are much required all about Entally and Tiljullah, *as well as along the Circular Road generally,* and I have known in very dry seasons this want not only extremely distressing to the poor Natives, but to poor Christians also on *both sides* of the Circular Road, who have often complained to me how much they feel the want of this essential necessary of life. Such large Tanks would not only produce mould to fill up little cavities, dirty pools, and certain unnecessary ditches, but they would, if placed where four roads meet, tend greatly to make the place more airy. I think Bishop Heber describes Mirzapore, where there was a school and some Missionaries, as dreadfully unhealthy;§ the clearing since adopted has rendered that place very healthy; the Bishop also, I think, was told by his Sirkar how notoriously bad the Entally Nullah was, and that he never passed it without his handkerchief to his mouth.

The Natives where they reside make all their Tanks small, and as if it was intended that Malaria should be produced, they seldom fail to *plant trees round* their Tanks, so that you commonly see the surface of them quite green from the vegetation—this must have been remarked by every one: such are abundant about Entally, on the right and left side of the Balleegunge lines, and all down the Russapaglah road and Tolly's Nullah, and not less so in *Kidderpore*. I am of opinion that trees ought never to be planted upon the borders or banks of Tanks or Nullahs, for their leaves invariably find their way into the water, and lying upon the edge decompose, and go much more to produce the Malaria we complain of, than they can act as a safeguard or barrier to arrest the Malaria, as *supposed by some authors,* although I do not deny that large belts of trees at a sufficient (I mean, a considerable) distance from a City, and *properly* placed, may *perhaps* have such good effect, but such an opinion ought not to induce the plant-

* Sir Edward Hyde East strongly advised broad roads in the direction of the winds and surface Draining instead of so many deep Drains as we have, which become stagnant. He thought the more superficial surface Draining properly managed, would keep the upper surface of the earth tolerably clear and dry. That part of Chowringhee behind the Theatre, and between that place and the Burying-ground, is acknowledged now to be much more healthy than it was before the new roads, Tanks, and buildings were made.

† Such a plan of building ought to be generally adopted in all low situations in Bengal.

‡ Since writing this, several houses have been thus improved; among them, three of the largest houses in Esplanade Row now are allowed to receive air, a clear breeze from the Maidán which was formerly shut out by high walls.—*August,* 1837.

§ Now an excellent Square, a good large tank with iron rails round the grounds, and Mrs. Wilson's School is in the corner of the Square. A large building is now erecting there by the General Assembly of the Scotch Church, for the education of Native youth, and the place is now acknowledged to be healthy.—*August* 1837.

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ing-trees near a City, where they are certain to be injurious, not only by their leaves rotting, but by impeding the winds, and preventing the rays of the sun approaching the ground, which remains damp, and assists in the unwholesome decomposition. Such is the case in all the Jungle villages around Calcutta, and is evidently the cause of the great yearly mortality in them. All the gentlemen who have gone with me in my drives, agree in the positive statement, that, throughout India, they never met with such crowded green pools, Jungle, and bad smells, as abound around Calcutta every where in the Suburbs; and it should here be remarked as regards filthy pools, and Tanks, that they may not only be the cause of sickness by contaminating the air, but may affect the Natives who constantly bathe in them, as well as *drink* the *filthy* water of such Tanks; for in all probability, Malaria *may* become impregnated with water, and may thus be taken into the system by the skin or stomach.

For farther improvements, and removing impurities of air at this Presidency, the Draining of the Lake and cutting down the Jungle beyond it, I conceive to be of great importance. The Jungle all down to the Sea should be removed, if possible, and it would be a great advantage, if Excavations,* or Docks, were made here and there, on each side of the New Communication for ships and vessels to lie in, so as not to obstruct the passage of vessels to and fro. The face of the Lake may probably be materially altered. Ritchie, who surveyed the Soondurbuns in 1791, speaks of the well-known village of Tarda, which is marked on all the maps (as being on the borders of the Lake). This place is now about the same distance from the furthest borders of the Lake, as the distance is from the Balliaghat entrance, along the navigable Canal to its present furthest *borders*, on the South, *Bamanghatta*; therefore if Ritchie was correct, a very large portion (nearly half) of the Lake must have filled up naturally, for on each side of the river from Bamanghatta to Tarda, is thick low Soondurbun Jungle. *I imagine that upon the finishing the Canal now making, and its opening into the Hooghly, that the Lake will almost Drain itself*†—as the low water of the river Hooghly is at times *lower* than the Lake at low water. Whether this Lake be Drained, or not, or either so partially Drained as to be fit only for rice cultivations, or otherwise warped by mud from the river, so as to be converted into garden ground, nevertheless, it is highly desirable for the general health, that not only the grounds on this side of it be cleared and improved, but that the Soondurbuns beyond it be removed as far from the capital as possible.

No. VII. *f.*

A. 5.

Letter to Sudder Nizamut Adawlut on the state of Grounds near the Insane Hospital, and generally throughout the Suburbs, pointing out the general Unhealthiness produced by their Jungly and Filthy state, with additional remarks made at a later period on the effects of the Inundations.—1828.

It will be seen that the number of Deaths in the Insane Hospital in these six months has been only 10, a number considerably less than has been usual during the same period for the last 12 years. It appears to me that this advantage has been produced by the making of four sunken and covered necessaries, the nuisance having previously been conveyed by an open Drain from the Hospital, and round the grounds.

* There has been a large Dock excavated near the Salt Works on this side of the Lake.—*8th June*, 1841.

† Such is the case now when the River is at its lowest, and the Flood Gates are allowed to be open.—*8th June*, 1841.

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F. Pemble, Esq. Surgeon, 24 Purgunnahs, June 1841.

I have the pleasure also to report, that there has since been much less illness than usual, which I consider mainly attributable to the improvement and change above alluded to. I beg leave, however, to remark, that the grounds contiguous to, and outside of the Hospital premises, are in my opinion, a most unwholesome nuisance, particularly during the rainy season, the water not being Drained off, but lying in the various hollows, there stagnates; and corrupting all vegetable and animal matter it meets with, produces an atmosphere most unwholesome even to Natives, who are used to it.

There is also close to the entrance gate a Burying-ground, which brings together dogs, vultures, &c. which of themselves are a considerable nuisance, and upon which grounds the prisoners from the Jail of the 24-Pergunnahs are daily taken in a body for their necessary occasions. Were they to be taken nearer to the Nullah to which this ground adjoins, or elsewhere for such purposes, and the practice of burying discontinued at that place, it would be not only desirable, but would conduce to the healthiness of the Hospital.

While remarking on the state of the grounds near the Hospital, it may not be irrelevant for me to observe, that having for upwards of twenty years applied my attention particularly to atmospheric* causes of disease, and having now for several years been Surgeon of the Suburbs of Calcutta, I may not be going far, if at all, out of my line of duty, in pointing out, that I consider much of the unhealthiness of the Suburbs, as well as of Calcutta during and after the rains, to arise in a great measure from the state of the lands in the Suburbs immediately round about the Town, but more particularly in the Soorrah, Entally, and Balleegunge part of the Suburbs. The lands bordering upon these parts, especially to the Eastward, are not only more covered with Jungle and decaying vegetable matter than elsewhere, but in almost every part of them numerous irregular excavations are to be met with, made for brick-making, and for similar purposes. In these various holes and cavities impure air is generated by the decay and putrefaction of vegetable matter in water, and if impure air so produced is, as it is known to be, capable of causing fever and dysentery, it is not unfair to conclude that certain modifications of this Malaria may also be the cause of cholera, which disease predominates in those climates and soils in which fever and dysentery abound. That it may be so produced, is I think sufficiently obvious by the well-ascertained fact, that ship's crews in a state of perfect health and a considerable distance, even some miles from the shore, have, by a sudden land wind coming on, been fatally attacked by the scourge. A striking instance of this nature is recorded by Dr. Macculloch in his very valuable work lately published on the subject of Malaria, a work entitled to the particular attention of medical men and others in this country, which is so pregnant with this source of disease. I will here add, that I can name at this moment several families about Entally, where the whole family are laid up with fever, produced most indisputably by the impure air generated about their neighbourhood, by the decomposition or decaying of vegetable substances, and several are now removing up to Chinsurah and to other places, their removal being more conducive to their recovery than any medicine they can take, while they continue to breathe this atmospheric poison.

(Signed) F. P. STRONG,
Surgeon to Suburbs of Calcutta.

* I was emboldened in these remarks to the Suddur Nizamut Adawlut made in 1828, from the circumstance of my having been from 1805 to 1815, Surgeon to the Kent Dispensary; during these Ten years I was in frequent communication with the late Dr. Macculloch, who has written so much upon Malaria, and the above appointment, together with my private practice, gave me an extensive opportunity of judging of the correctness of that gentleman's opinions; and I knew well, some of the localities he alludes to in his work, and know his remarks to be quite correct.

These circumstances brought my attention to the subject of Malaria at an early period.—*August* 1837.

(Sd.) F. P. S.

No. VII.
F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, 8th June 1841.

No. VII. *g.*

A. 6.

Copy of the 9th Paragraph of F. P. STRONG, *Esq. Letter to the Medical Board, dated January 27th,* 1834.

There are in more distant parts of the Suburbs, guards or depôts of prisoners, who are not so comfortably provided for as those in the Jails, and I have sometimes had occasion to remark upon their unhealthiness, particularly the one at Garden Reach*, which was situated in the midst of Drains, and from which five cases of cholera came into the Hospital in four days. The Nazir's guard, situated in Kidderpore, was so unhealthy in the last quarter of 1832, that fourteen cases of most malignant cholera came into the Hospital from that guard in less than a week, as was noticed in my Returns.

(*Signed*) F. P. STRONG.

No. VII. *h.*

A. 7.

Copy from the 9th Paragraph of a Letter from F. P. STRONG, *Esq. to the Medical Board, dated March 21st,* 1835.

The same patients (alluding to the patients of the Native Insane Hospital) after being discharged apparently cured, coming into the Hospital again and again from obviously unhealthy localities, and other considerations connected with unhealthy situations which would embrace too much space to enter upon at large in this Report, tend to confirm me in my opinion, that in the climate of this part of Bengal, atmospheric Malaria, aided by the sudden variations in the temperature of the air, and consequent sudden check to perspiration,—by bad food, poverty, miserable clothing, and housing in huts crowded together in swampy filthy situations, with a want of cleanliness and ventilation,—by the habits of long fasting, and the use of impure water, (this being the usual mode of existence among the lower orders of Natives.) is highly calculated to produce diseases, which often ultimately end in insanity.

This general cause of disease which so much predominates in the Suburbs of Calcutta, I forcibly brought to the notice of the Sudder Nizamut Court in the year 1828. About this time I was requested to wait upon the Governor General, and I afterwards wrote several papers upon the subject to his Lordship, in which I entered into an explanation of what I conceived to be the principal causes of Unhealthiness in Calcutta, its neighbourhood, and the lower part of Bengal. In doing this, I was naturally led to make some remarks upon those great sources of Malaria,—the Salt Water Lake and the Jungly Soondurbuns

* A new Guard House for the prisoners has since been erected on a spot fixed upon by myself, and the executive Officers.—F. P. S. *8th June* 1841.

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adjoining, considering that the Draining of the one, and the Clearing of the other, would be a great Public benefit, if even done only with a view of removing such causes of Malaria, and consequent illness.

In some of the unhealthy spots, but particularly that broad belt of dense Jungle and ill-Drained ground, which exists from the Dum-Dum road, and is continued through Sealdah, Entally, Balleegunge, Bhowanipore, and down the Russapuglah roads, reside a vast number of people of all denominations connected with the City of Calcutta, and who are constantly suffering from illness, which I conceive might be, in a great degree, obviated by removing such evils by a proper system of large clean Tanks*, with no trees upon their banks; raising the ground; Regulations against Nuisances; and good Draining. Were this, or some similar plan adopted, we should get air more fresh and free, and a healthiness would, I think, be obtained, that does not now exist.

In one of the papers I have alluded to, as having formerly written, I particularly mentioned that the year 1828 was a more healthy year than any I had known; I did not then anticipate that the following years would have been so calamitous.†

The last five years, the period for which the Medical Board require to be furnished with the details before alluded to, have been unhealthy to a degree unheard of or unknown before, owing no doubt to the Inundations which have extensively existed to an unprecedented degree; particularly in the four last years, an Inundation having occurred in each year, sweeping away a great part of the population between parts of the 24-Purgunnahs to the Southward of Calcutta and the Sea, and spreading over other lands to an enormous extent; destroying the cattle, and the produce of the earth, which has not yet recovered from its effects. Most of the wretched Inhabitants, of these before populous districts, who were not drowned, fled towards our City, and several of these unfortunate beings became inmates of the Insane Hospital. One instance in particular, I would wish to be allowed to refer to, as it is a strong case in illustration of the deep distress that must have been felt; and as exemplifying one of the causes of insanity.

The establishment at Gurriah-haut for affording them relief having been some time broken up, these poor unfortunate and starving wanderers were sent to my Hospital at Allipore, where I had frequently 60 or 80 of them at a time in Hospital. One poor woman was quite frantic; she would not be comforted or silenced, and becoming obviously Insane, she was transferred to the Insane Hospital last December. There she would take no nourishment, she said the floods had robbed her of her children, and she died in a few days, of extreme exhaustion.‡

Three of these Inundations, in the lower parts of Bengal, to which I have referred, were from the Sea,§ and the other, the last, was produced by the overflowing of the Damoda river.

* At page 224 of Appendix D to the Municipal Committee's Report will be found printed a Letter addressed by me to the Committee, on the subject of forming Tanks.—*8th June* 1841

(*Sd.*) F. P. S

† The paper was written in July, 1829. For a short period, about the middle of the year 1828, there was a good deal of Fever in the Entally Suburbs, but the following twelve months were healthy *August*, 1837.

‡ September 21st, 1833. I was asked by the Magistrate, Mr. Barlow, to suggest any means for arrangements,—so many prisoners and paupers being sick, he did not know how to lodge them,—to which, on the 22nd, I replied, that "if the paupers increased greatly, the old Bhowanipore guard, into which we put the Nazir's people, with evident advantage, might be available upon this occasion," and I recommended the removal of convalescent ulcers to the Jail, to make room for paupers in the Hospital, while the guard was getting ready.—*August*, 1837

§ These Sea Inundations produced extraordinary mortality, so also did the Damoda Inundation; but not by any means equal to those of the Sea. The discovery of a large proportion of sulphuretted hydrogen in the waters of the Estuaries and Coast of Africa, by Professor Daniell, is likely to lead to some useful results in the investigation of

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These particular floodings, I mean the Sea and the Damoda river, are unfrequent when compared with the overflowings of the Ganges, which are more frequent, and seldom attended with equally serious consequences. It will be seen, by a reference to the Transactions of

the nature and causes of Miasmata arising from Inundation of the Sea. The presence of sulphuretted hydrogen in water is easily detected by the brown colour of the precipitates afforded by nitrate of silver, and by acetate of lead; but for purposes of investigation, the gas should be collected, and its quantity in a given portion of water, accurately ascertained in all situations in which Miasmata on the Sea coasts prevail. It is worthy of remark, that some facts recently brought to light, give reason to believe, that the mortality on the Coast of Africa may be caused, or is certainly much *increased* by the exhalations of the Sea water, which in some instances, contains more than eleven cubic inches of sulphuretted hydrogen in a gallon. Now when it is considered that so small an admixture as one-fifteen-hundredth part of this deleterious gas in the atmosphere acts as a direct poison upon all animals, it is difficult to believe that it does not aggravate, if not *directly originate* disease on those coasts where it abounds.

Professor Daniell feels convinced, that the evolution of sulphuretted hydrogen is intimately connected with the unhealthiness of such stations, and he alludes to the sufferings described by the traveller, Macgregor Laird, whose illness occurred in the very locality from which some of the waters, which the Professor examined, were taken, and he mentions that the test of a little solution of the sulphate of copper will detect its existence, and adds, that the contact of chlorine with sulphuretted hydrogen, instantly effects its decomposition, and renders it perfectly innoxious. He refers to the 19th vol. of the Annales de Chemie, p. 225, to shew that the worst cases of Malaria are connected with the decomposition of the sulphates in Sea water; and has shewn in the most satisfactory manner, that by excluding the Sea from certain extensive Marshes, there were no appearances in the following year of the terrible maladies which had appeared every year previously from the mixture of Fresh and Salt Water, which in summer was rarely changed, and becoming corrupt, spread infection over the neighbourhood, of the most destructive kind. Professor Daniell, in a letter to Capt. Washington, R. N. gives the following results of some experiments on the action of Sea water upon decomposed vegetable matter; and also a simple mode for fumigation by Chlorine, to obviate the bad effects of this poison.

To CAPTAIN WASHINGTON, R. N

MY DEAR SIR,

As any confirmation of my idea, that the unhealthiness of the African coast is dependent, in a great degree, upon the evolution of sulphuretted hydrogen, is calculated to give confidence to those who are about to start upon the Expedition to the Niger, from the certainty of the means of counteraction within our power, I hasten to communicate to you the result of an experiment which certainly determines the origin of that deleterious gas to be the re-action of vegetable matters upon the sulphate of soda in Sea water.

On the 2nd of November last, I placed a quantity of newly-fallen leaves in three glass jars capable of holding about $1\frac{1}{4}$ gallon of water.

No. 1. Upon the first I poured about a gallon of New River water.

No. 2. Upon the second I poured about the same quantity of the same water, in which 3 ounces of common salt had been dissolved.

No. 3. Upon the third, the same quantity of water in which three ounces of crystallized sulphate of soda had been dissolved

The three jars were then placed in a warm chamber, the temperature of which varied from about 70° to 110,° and the water was filled up from time to time, as it evaporated, and the mixture well stirred.

Upon examining them yesterday, the following was found to be the state of the jars:—

No. 1. Had a very disagreeable odour, but produced no change whatever upon paper soaked in acetate of lead.

No. 2. Was perfectly sweet, and possessed, indeed, a rather agreeable odour. It produced no effect, of course, upon the test paper.

No. 3. Had a most insupportable sickening odour, much worse than that of pure sulphuretted hydrogen, and instantly blackened paper soaked in acetate of lead, throwing down sulphuret of lead with a metallic lustre.

If you, or any of your friends, would like to see the experiment in its present stage, it would give me the greatest pleasure to shew it.

Now, for all this, chlorine fumigation is the certain remedy, and I have taken the liberty of sending you herewith some Memoranda for conducting the process, with the earnest hope that they may be useful to the Expedition.

I remain, &c.
J. F. DANIELL.

KING'S COLLEGE,
5th February, 1841.

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the Physical Class of the Asiatic Society, page 260, part 1,—"That an Inundation of the Sea, or of the Damoda river, is supposed not to happen oftener than once in a Century." That remark is in allusion to the dreadful Inundation in 1823; and I can find no other account of any Sea Inundation, except the eventful one of nearly a Century ago, which happened in the night, between the 11th and 12th October, 1737, to be found in the Gentleman's Magazine 1738-9: besides great damage to shipping and boats, 3,00,000 souls are said to have perished.

I know of no written record as to the effect of this Sea Inundation upon the health of the Inhabitants, although it was an event sufficiently remarkable to be handed down from father to son; and I have met with old Natives who have heard of it from their fathers. But of the late Inundations which I allude to, their effects are so generally known, that it is unnecessary for me to dwell upon them, although I may be allowed to add, from inquiries I have made, that these effects have not been confined to the poor alone, but that landholders of respectability, and their families, have been carried off by disease, and this over a vast extent of populous country, and particularly so in parts bordering on our South and South-east Suburbs of Calcutta; and great numbers of these Zemindars who fled to Bhowanipore, and to this City for change of air and Medical attendance, died of the diseases produced in their Villages. In corroboration of what I have stated as to the general unhealthiness produced by the Inundations, and the consequent impure atmosphere, I beg leave to mention a few particular examples which I have learnt. One Native gentleman of wealth assures me, that his property has been greatly increased by the numerous deaths in his family; and another old gentleman has often enumerated to me the dreadful mortality, which has deprived him of all those relations of his, who lived beyond Gurriah-haut, about Barriepore. Another Native who is Interpreter to the Mysore Princes, named Nilcomul Bonnerjee, who resides at Bhowanipore, writes me that his wife a few days after the Inundation of 1833, went to her father's at Barro, a village three coss South of Barriepore, in a pregnant state, and found two, three, and four persons die every day at each house; that they wanted hands to bury the dead; that in two or three days her mother, brother, aunt, uncle, and nine near relations died; she was confined, and there was no one to look after her. The writer on hearing this, sent three women and four servants, they all returned ill to his

Memoranda for Fumigation by Chlorine.

One part by weight of common salt, and one part of the black oxide of manganese are to be acted upon by two parts of oil of vitriol, previously mixed with one part, by weight, of water (9 measures of acid, 10 of water,) and left till cold. Such a mixture will immediately begin to evolve chlorine at a temperature of 60°, and continue to do so for four days in a gradual manner, without the application of any extraneous heat.

The vessels in which the mixture is made may be flat pans of any common earthenware.

3¼ lbs. of the mixed salt and manganese, with 4¼ lbs. of the mixed acid and water, are calculated to yield 5¼ cubic feet of chlorine.

In suspected situations it would be desirable to have one or two charges of 3¼ lbs of the salt and manganese placed on the windward side of the deck, to be renewed on every fifth day.

It is, however, impossible to give directions for the exact quantity, the object being to preserve an atmosphere smelling of chlorine, but not sufficient to produce any irritation of the lungs, or coughing.

Between the decks this kind of fumigation would be too strong; but pans containing chloride of lime and water would be sufficient protection:—the solution, however, should be frequently renewed.

A charge of the chlorine mixture would be very advantageously placed in the hold, if it were to be found not to produce any serious annoyance. It should also be remembered, that there is nothing injurious in the odour of chlorine, provided it be not in such excess as to produce coughing.

J. F. DANIELL.

King's College,
5th February 1841.

(*Sd.*) F. P. S.

Calcutta,
8th June 1841.

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residence, and with exception of his wife and child, they all died in a week. Ever since his wife has been ill with fever and spleen until lately cured. He states, that at this time the number of children daily sold by destitute parents in the 24-Purgunnahs is enormous.

I have a letter before me, signed by the old gentleman; he writes—"In confirmation of the truth of Nilcomul Bonnerjee's letter, I can say that I had thirty relations residing in the neighbouring villages in 1832-3: only one boy is now living, but ill with spleen, out of all these relations. A great number of respectable families suffered, as Cossinauth Mullick, Bhagwan Chowdry, and others of opulence and respectability. The first and twenty others, (being the whole of his family,) all died except one girl; and the last and about eleven in family, all are dead but one boy, who ran away to his uncles. This misfortune was almost universal."

It would not be difficult to add many similar examples, all equally proving the wide-spread devastation and death caused by the flood and the impure atmosphere; and I have given the above information in the same detailed manner as I have heard it, to shew the vast extent of general mortality. Many must have been lost in obscurity; for when we see families possessing the necessaries and comforts of life suffering to so great an extent, it may readily be conceived, how great must have been the sufferings of the poor, abject, and starving.

(Signed) F. P. STRONG.

NOTE.—Both these places, referred to in the above extracts, are now much improved.—*29th August* 1837.
(Sd.) F. P. S.

No. VII. *i.*

A. 8.

Letter from F. P. STRONG, ESQ. *dated 4th October* 1830, *to* MAJOR BENSON, *returning the late* DR. BUCHANAN'S *Papers, and sending, for the information of the Governor General, some Papers written by* CAPT. JENKINS.

To MAJOR BENSON,
Military Secy. to the Governor General.

MY DEAR SIR,

Pray accept my best thanks for the Papers on the means of promoting the Health, Comfort, and Convenience of the Inhabitants of this City, which I now return with many apologies for keeping them so long. Not trusting my own judgment regarding the nuisances of the Town, I sought the opinion of Captain Jenkins, who has written some Papers on several of the Nuisances, and proposed to remedy some, and with his permission I enclose them for the perusal of the Right Honourable the Governor General. I will only in this place, venture to express a hope, that when the new Eastern Canal is finished, that the levels of Calcutta will be efficiently taken, and something in the way of Draining the Town done.

Regarding the Suburbs, the paper marked No. 21.* exhibits a deranged state of things, similar to what now actually exists. Many of the recommendations there suggested to Drain and Level the Grounds about Kidderpore, where the stagnant water is represented as being injurious to persons residing in that neighbourhood, and on the grounds both on the right and left of the Allipore road, just beyond the bridge, now particularly apply. It is also there stated, that the grounds behind the General Hospital had been represented as having been injurious to the Invalids in Hospital; a road is proposed to be made from this part towards Bhowanipore, or the Russapaglah road; and one crossing this from near the Hospital, Southward to Kalighaut; and it is remarked that these roads would be of material consequence to the Natives. A Cut also from Tolly's Nullah behind the General Hospital is suggested. If such Cut or Canal were made to join the New Eastern Canal, now nearly finished, in the North-eastern division of the Suburbs, it would of course be extremely desirable for the Drainage of Chowringhee, and all that part of the City; the bad state of Drainage, Jungle and Swamps throughout the Suburbs, and particularly down the Russapaglah road, I have already brought to the notice of the Governor General, and must not now intrude further upon his Lordship's valuable time, but subscribe myself, with many thanks to you.

No. VII. F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs 8th June, 1841.

* Referring to Dr. Buchanan's papers returned by Dr. Strong, to Major Benson.—J. M.

Yours, &c.

4th October, 1830. (*Signed*.) F. P. STRONG.

No. VII. J.

A. 9.

Letter from MAJOR TAYLOR, *calling on* F. P. STRONG, ESQ. *to attend a Committee at the Government House on Draining Calcutta, the Lake, &c.*

To DR. STRONG.

MY DEAR SIR,

The Governor General has desired me to request you to meet the gentlemen named in the margin† at the Government House on Tuesday next, at half-past two o'clock P. M. for the purpose of considering the Drainage of Calcutta in connection with the present Circular Canal, and the project of extending it round the Salt Water Lake into the deep water channel at Bhamunghatta, together with the Drainage and Silting up of the Salt Water Lake.

GOVT. HOUSE,
27th December, 1834.

Yours, &c.
T. W. TAYLOR.

† D. McFarlan, Esq
R. D. Mangles, Esq
Capt Steel,
Dwarkanath Tagore,
Col. Galloway,
—Hoseason, Esq.
J. Kyd, Esq.
Capt. Fitzgerald,
Ramcomal Sein,
Col Tickell, C B
J R Colvin, Esq
J. Prinsep, Esq.
Capt. J Thomson,
Capt. Forbes.

No. VII.
F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, 8th June, 1811.

No. VII. *k*.

A. 10.

Letter from F. P. Strong, Esq, to Mr. Mangles, transmitting some Papers.

To R. D. MANGLES, ESQ.
Secretary to Government of Bengal.

Sir,

It affords me considerable pleasure to observe, that the Medical Topography of this City, and its Suburbs, is exciting attention; and as it is likely that this subject in connection with the Fever Hospital may be brought before the Government, I feel it in some degree incumbent on me, from the situation I hold, to forward to you, to be laid before Government, whenever the subject may be brought to their attention, some papers, shewing that so long ago as the year 1828, I had addressed the Sudder Nizamut Adawlut, as well as the Right Honourable Lord William Bentinck, and on a later occasion, the Medical Board, upon the same subject; and it will give me great satisfaction to find, that some *active* measures of Improvement result from the present discussion.

Calcutta,
June, 1835.

I am, &c.
(Signed) F. P. STRONG.

No. VII. *l*.

A. 11.

Letter from Mr. Mangles, acknowledging the receipt of the above Papers.

To Dr. F. P. STRONG,
Assistant Surgeon of the 24-Purgunnahs

Sir,

I am directed by the Honourable the Governor of Bengal, to acknowledge the receipt of the interesting Papers, to which your letter of the 18th instant gave cover, and to assure you, that your opinions will not be overlooked when the matters to which they relate come under the consideration of Government.

I am, &c.

Fort William,
The 23rd June, 1835.

(Signed) ROSS D. MANGLES,
Secretary to the Government of Bengal.

No. VII
F. Pembie Strong, Esq Surgeon to 24-Purgunnahs, 8th June 1841

No. VII. *m.*

A. 12.

Census of the Population in the Suburbs of Calcutta.

Names of Thannahs.	No. of Villages	No. of Mehals.	Resident Hindu Adults	Hindu Children.	No. of Hindus in Service.	Resident Mussulman Adults.	Mussulman Children.	No. of Mussulmans in Service.	Native Lodgers or Passengers.	European Adults.	European Children.	East Indian Adults.	East Indian Children.	Total Inhabitants.
Thannah Sulkeah, ...	132	258	33,223	20,342	*8,106	12,154	4,395	*2,019	3,153	43	24	63	49	73,446
Ditto Chitpore, ...	8	33	14,177	5.286	984	1,627	601	199	875	23	7	53	1	22,650
Ditto Manicktulah, ...	31	42	20,627	6,173	30,100	13,201	9,661	3,098	3,883	441	67	759	123	54,935
Ditto Tauzeeraut, ...	29	84	22,032	5,349	1,120	8,601	2,755	647	5,072	54	15	45	27	43,950
Ditto Nowhazaree, ...	1	28	8,465	2.689	799	5,845	2,214	987	2,818	63	3	50	65	22,212
													Grand Total,	2,17,193

* The columns are not included in that of the Total

No. VII.
F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, 8th June, 1841

No. VII. *n.*

A. 13.

Abstract Statement of Deaths among the Native Inhabitants of the City of Calcutta during the following years, shewing the number per Month, the Grand Total, and the average rate per cent. as per last Census.

Years.	January.	February.	March.	April.	May.	June.	July.	August	September	October.	November.	December.	Grand Total.	Average per cent. per last Census.	
1831	No Returns.		179	456	342	325	384	463	589	682	1,067	753	5,240	2·90	
1832	880	571	691	637	754	511	616	759	885	951	988	1,065	9,308	4·28	
1833	1,167	1,170	1,519	1,710	1,209	683	898	1,088	1,657	1,788	2,449	2,185	17,523	8·07	
1834	1,068	732	891	1,326	1,296	589	958	1,224	983	1,198	1,564	1,238	13,067	6·02	
1835	867	624	683	662	673	492	633	568	676	771	870	593	8,112	3·78	
1836	637	535	680	692	628	600	623	733	638	770	713	641	7,895	3·63	
1837	652	562	631	661	725	1,034	733	763	661	645	669	728	8,464	3·89	
1838	674	721	1,651	2,389	1,434	549	487	632	663	628	767	798	11,393	5·24	
1839	606	599	577	604	465	484	588	594	502	756	851	1,349	7,975	3·67	
1840	1,326	1,356	1,349	1,095	854	555	746	807	834	706	1,101	1,001	11,730	5·40	
	7,877	6,870	8,851	10,232	8,380	5,822	6,671	7,631	8,088	8,895	11,039	10,851	1,00,707	4 64	Per Annum.

No. VII.
F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, 8th June, 1841.

No. VII. *o.*

A. 14.

Mortality among all Classes in Calcutta for 20 years, but for the Native Population only 8 years.

Years.	Protestant	Burials.	Catholic Burials, D. Rozario.	Catholic Burials, Boitockanah.	Greeks.	Armenians.	Indo-Armenians.	Native Christians.
1817	216	Scotch burying-ground began 1826.	313	169	4	10	3	
1818	272		211	159	2	20	3	
1819	275		284	158	0	23	3	
1820	281		282	136	0	17	1	
1821	246		277	172	0	16	3	
1822	324		294	140	0	16	2	
1823	270		277	156	0	10	2	
1824	278		282	188	0	21	1	
1825	297		285	154	1	12	10	
1826	275		309	145	2	19	17	
1827	254	11	308	174	0	15	16	4
1828	256	19	250	170	2	15	12	3
1829	184	21	209	146	3	12	16	2
1830	224	26	236	138	1	14	15	0
1831	186	29	236	122	3	17	19	8
1832	217	25	269	121	1	17	16	1
1833	302	30	288	204	2	23	14	5
1834	281	35	257	199	2	16	17	4
1835	233	18	233	115	1	7	16	4
1836	197	26	188	104	0	15	13	3
	5065	240	5288	3070	24	315	199	34
	20	10	20	20	12	20	20	9
Avg.	253	24	264	153	2	15¾	10	3⅓

Natives.

Native Deaths for 8 years.

Hindu, ...	8,299	9,308 in 1832.
Mussulman, ..	1,009	
Hindu, ..	15,138	17,523 in 1833.
Mussulman, ..	2,385	
Hindu, ..	11,167	13,067 in 1834.
Mussulman, ..	1,900	
Hindu, ...	6,873	8,102 in 1835.
Mussulman. ..	1.229	
Hindu.	6,366	7,881 in 1836.
Mussulman, ..,	1,515	
Hindu, ...	7,097	8,464 in 1837.
Mussulman, ..	1,367	
Hindu, .., ..	9,802	11,316 in 1838.
Mussulman, ...	1,514	
Hindu, ...	6,570	7.975 in 1839.
Mussulman, ..	1,405	

No. VII.
F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, 8th June, 1841.

No. VII. *p.*

A. 15.

Statement of the Mortality per cent. among the different Classes of Inhabitants in Calcutta per Census and Tables of Mortality for 5, 8, 10, 20, and 23 years.

Denominations.	Population per Census	Mortality per Tables of Mortality and Registers of Burials.												Average Mortality of the several classes and periods ascertained.						General Mortality of Calcutta as far as ascertained.	
		For 5 years ending 1836		For 10 years ending 1836.		For 20 years ending 1836.		For 1837.		For 1838.		For 1839.		For 8 years.		For 13 years		For 23 years			
		Died Annually.	Per Cent. per Annum.	Died Annually.	Per Cent per Annum	Died Annually.	Per Cent. per Annum.	Died.	Per Cent.	Died.	Per Cent.	Died.	Per Cent.	Died. Annually.	Per Cent. per Annum	Died Annually.	Per Cent. per Annum.	Died Annually.	Per Cent. per Annum.	Died Annually.	Per Cent. per Annum.
Christians, Scotch Burials,		..	..	24	..	..	..	34	..	40	..	45	..	..	..	35¾	..	..			
	7884	..	..	..	..	..	3·51	..	3·34	..	5·43	..	3·94	..	..	..	..	..	3·55		
Protestant, ...		..	..	..	..	253	..	230	..	231	..	265	..	..	..	..	..	244¾			
Catholics, Principal Church,		..	..	..	..	264	..	251	..	266	..	233	..	..	...	..	..	253½			
	3341	..	..	..	..	..	12·48	..	10·56	..	11·64	..	9·18	..	..	..	..	..	10·97		
Ditto, Boitockanah Church,		..	..	..	..	153	..	102	..	123	..	74	..	..	..	..	..	113			
Armenian, ...		..	..	..	..	15	..	23	..	15	..	20	..	..	..	..	..	18¼			
	636	..	...	..	...	..	3·93	..	4·87	..	4·56	..	4·56	..	,,	..	..	..	4·48		
Inde-Armenian, ...		..	..	..	..	10	..	8	..	14	..	9	..	..	..	..	..	10¼			
Total Christians.	11,861	..	..	24	..	695	6·06	64.	5·46	689	5,81	646	5.44	..	..	35¾	..	639¾	569		
Mahomedans, ...	59,622	1607	2·69	..	..	..	..	1367	2·29	1514	2.53	1405	2·35	1473	2·47	...	..	..	..		
Hindoos, ...	1.57,418	9569	6·7	..	..	..	..	7097	4·50	9802	6 22	6570	4·17	8260	5.24	.	..	...	..		
Total of all Classes. ..	2,28,901	11,176	+	24	+	695	5·20	9112	3·98	12005	5.24	8621	3·76	9733	×	35¾	×	639¾	..	10,408½	4·54

No. VII.
F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs. 8th June, 1841

No. VII. *p.*—*Continued.*

A. 15.—*Continued.*

Proportions.

Census.

	Armenians.	Catholics.	Protestants.	Mahomedans.	Hindoos.
Mahomedans, 1 to					$3\frac{2}{3}$
Protestants, 1 to				$7\frac{1}{2}$	20
Catholics, 1 to			$2\frac{1}{3}$	18	$47\frac{1}{8}$
Armenians, 1 to		$5\frac{1}{4}$	$12\frac{1}{3}$	$93\frac{3}{4}$	$247\frac{1}{2}$

Annual Mortality.

	Mahomedan.	Protestants.	Armenians.	Hindoos.	Catholics,
Hindoos, 1 to					$1\frac{5}{6}$
Armenians, 1 to				$1\frac{1}{3}$	$1\frac{5}{11}$
Protestants, 1 to			$1\frac{2}{5}$	$1\frac{5}{9}$	$3\frac{1}{12}$
Mahomedan, 1 to		$1\frac{5}{12}$	$1\frac{5}{6}$	$2\frac{3}{8}$	$4\frac{5}{18}$

No. VII.
F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, 8th June, 1841.

No. VII. *q.*

A. 16.

Abstract Statement of Deaths among the Prisoners of the Allipore and Russapaglah Jails, and different Guards in the 24-Purgunnahs, during the following years, shewing Number per Month, the Grand Total, and the Average rate per cent.—1711$\frac{7}{20}$ being the average Number of Prisoners throughout the period; more than two-thirds of those are Prisoners for life, the rest temporary, like all other Zillah Prisoners; shewing the three months of greater Mortality to be the cold weather months, as in Calcutta.

Years.	January. No. of Prisoners.	January. No. of Deaths.	February. No. of Prisoners.	February. No. of Deaths.	March. No. of Prisoners.	March. No. of Deaths.	April. No. of Prisoners.	April. No. of Deaths.	May. No. of Prisoners.	May. No. of Deaths.	June. No. of Prisoners.	June. No. of Deaths.
1820	1,833	30	1,903	13	1,996	20	1,921	16	1,940	16	1,831	9
1821	1,816	17	1,809	10	1,832	11	1,927	12	1,574	11	1,995	7
1822	1,795	18	1,805	7	1,879	13	1,799	11	1,948	4	1,801	3
1823	1,629	11	1,614	10	1,595	10	1,593	7	1,635	6	1,571	10
1824	1,481	6	1,529	11	1,425	9	1,375	6	1,403	8	1,328	11
1825	1,599	6	1,498	10	1,434	17	1,463	18	1,249	17	1,187	8
1826	1,117	7	1,137	4	1,138	2	1,161	3	1,129	14	1,142	6
1827	1,179	6	1,212	4	1,116	7	1,153	7	1,226	15	1,232	1
1828	1,227	11	1,153	7	1,260	23	1,299	11	1,338	7	1,304	5
1829	1,327	15	1,289	4	1,376	6	1,330	12	1,395	6	1,386	5
1830	1,486	3	1,552	6	1,457	8	1,497	4	1,536	6	1,536	10
1831	1,474	19	1,575	10	1,586	11	1,651	9	1,632	16	1,619	11
1832	2,219	23	2,013	7	1,924	22	1,909	11	1,944	10	1,984	6
1833	2,067	12	2,118	13	2,372	28	2,170	11	1,918	7	2,117	7
1834	2,322	18	2,907	9	2,317	13	2,154	14	2,147	9	2,111	10
1835	2,109	23	2,188	7	2,211	11	2,037	13	2,035	14	2,225	9
1836	1,806	8	1,776	5	1,720	3	1,894	9	1,829	6	1,796	7
1837	2,021	10	1,928	3	1,953	9	1,947	4	1,952	8	1,984	15
1838	2,025	8	2,046	7	2,159	8	2,143	11	2,121	12	2,203	10
1839	2,215	10	2,242	12	2,130	8	2,089	13	2,109	8	2,087	16
	34,747	261	35,224	159	34,881	229	34,512	202	34,390	200	34,459	106
Percent. p. annum	1,737	504	1,761	539	1,744	829	1,726	701	1,719	700	1,724	374

Years.	July. No. of Prisoners.	July. No. of Deaths.	August. No. of Prisoners.	August. No. of Deaths.	September. No. of Prisoners.	September. No. of Deaths.	October. No. of Prisoners.	October. No. of Deaths.	November. No. of Prisoners.	November. No. of Deaths.	December. No. of Prisoners.	December. No. of Deaths.	Grand Total of Prisoners	Grand Total of Deaths.	Average Number of Prisoners.	Deaths per cent.
1820	1,807	16	1,821	9	1,700	11	1,765	13	1,681	10	1,750	16	21,888	179	1,824	9·81
1821	1,891	10	1,778	16	1,772	20	1,762	9	1,759	24	1,762	20	22,080	170	1,840	9·24
1822	1,880	9	1,651	11	1,612	11	1,597	20	1,571	9	1,544	14	20,871	136	1,739	7·47
1823	1,511	10	1,416	12	1,390	10	1,404	14	1,394	9	1,385	9	18,163	118	1,514	7·79
1824	1,228	7	1,263	7	1,29[illegible]	11	1,295	5	1,491	4	1,559	4	16,698	87	1,391	6·25
1825	1,139	9	1,151	13	1,051	15	1,173	8	1,122	12	1,088	7	15,154	140	1,263	11·08
1826	1,118	6	1,158	7	1,157	3	1,177	6	1,113	3	1,140	6	13,697	67	1,141	5·87
1827	1,298	2	1,304	5	1,210	7	1,271	8	1,242	6	1,198	5	14,641	73	1,220	5·98
1828	1,287	8	1,298	3	1,327	3	1,287	6	1,365	6	1,309	10	15,454	100	1,288	7·76
1829	1,431	8	1,466	5	1,386	6	1,459	3	1,487	4	1,889	12	17,221	86	1,435	5·99
1830	1,564	6	1,573	10	1,566	8	1,553	25	1,521	29	1,859	21	18,730	134	1,561	8·58
1831	1,685	7	1,615	11	1,545	12	1,531	29	1,945	29	2,081	23	19,893	187	1,658	11·27
1832	2,227	4	2,047	11	1,706	12	1,964	19	2,153	24	1,909	27	23,999	176	2,000	8·80
1833	1,982	10	1,991	21	2,037	23	2,217	37	2,087	33	2,209	29	25,285	231	2,107	10·96
1834	1,988	14	1,872	16	1,879	17	1,896	28	1,785	19	1,913	22	25,191	189	2,099	9·01
1835	2,118	6	2,013	8	2,002	9	1,842	7	1,836	7	1,883	10	24,500	124	2,042	6·07
1836	2,103	7	2,024	11	1,869	8	1,875	12	1,706	13	1,876	11	22,272	106	1,856	5·38
1837	1,912	8	1,916	8	1,939	6	1,938	8	1,961	12	2,048	10	23,529	101	1,961	5·15
1838	2,237	9	2,131	9	2,221	12	2,160	11	2,155	13	2,165	19	25,826	129	2,152	5·99
1839	2,125	5	2,170	6	2,217	5	2,179	11	2,175	16	2,062	19	25,800	129	2,150	6·0
	34,526	161	33,758	202	32,872	209	33,284	275	33,553	282	34,656	294	4,10,892	2,650	34,241	7·75
Percent. p. annum	1,720	562	1,687	717	1,643	761	1,661	901	1,677	1007	1,732	1016			1,712	

No. VIII.

No. VIII. Samuel Smith, Esq. 22nd June, 1841.

To J. GRANT, ESQ.
Member of the F. H. and M. I. Committee.

SIR,

I was duly favored by the receipt of your Letter of the 17th February last, but as I was, at the time, on the point of leaving Calcutta for a season, and therefore unable to give due personal attention to the subject before my departure, I took the liberty to forward the Queries, respecting Intally, to the Members of the Intally Conservancy Committee, of which I am Chairman, with a request, that all or any of these gentlemen would assist me in replying to your Questions. Two Members* have complied with my request, and as they possess much local knowledge, and have resided for several years in Intally, which I have not, I take the liberty to enclose their replies, as well as my own, and hope they may afford your Committee some information, though not all that has been required.

I have the honor to be,
Sir,
Your most obedient servant,
SAMUEL SMITH.

DORJEELING,
22nd June, 1841.

No. VIII. *a.*

Answers by S. SMITH, ESQ. to the same Queries to which Answers were requested from W. C. BLAQUIERE, ESQ. by the Committee, upon the Fever Hospital and Municipal Improvements, 16th February, 1841.—Vide pages 21 to 24.

A. 1. I have never resided at Intally for more than three or four months at a time, during the hot season; but I have had a house in that Suburb for about seven years, and have visited it frequently.

A. 2. My house is close to the Canal, and about two miles from Government House, Calcutta.

A. 3. My house is in a principal Street, called the North Road.

A. 4. There are *now* but a few trees near my house—formerly there were many: as there are still all over Intally—a perfect Jungle in many parts of it.

A. 5. I consider Intally healthier than the densely populated parts of Calcutta, especially in the hot weather and the rains: it would be so most decidedly at all seasons, in my opinion, were Intally cleared from Jungle, and properly Drained.

A. 6. I always feel in better health and spirits when at my Garden house, (Intally,) than I do at my Town house, although that is in Tank Square.

* Messrs. T. Wilson, and M. Crow.— J. M

No. VIII.
Samuel Smith, Esq.
22nd June, 1841.

A. 7. Yes—because Intally is covered with Jungle and filthy stagnant pools and tanks; but I have often observed, in my morning rides, that the Maidan in front of Government House has been enveloped in fog, when there has been none in Intally.

A. 8. From 1st March until 31st August.

A. 9. Fevers, Agues, Dysentery, and Spleen, amongst the Natives, caused principally, as I believe, by the low damp huts they dwell in, and the use of bad water.

A. 10. There have been Epidemics, but I cannot speak precisely as to their nature. The Cholera principally, arising as I suppose from the causes stated in para. 9, and from exposure of the person to the damp night air, and to sudden chilling changes of the atmosphere, unprotected by proper clothing.

A. 11. The accumulation of filth and silt was very offensive at one time, and is so still, at the head of the Canal, near the Circular Road. People have forsaken their houses on this account. But the evil is of late much abated, by greater attention to cleansing it, and by the opening into it of the River through the Circular Canal.

A. 12. I have no opportunities of personal observation on the subject; but I have always considered the vicinity of the Salt Water Lake as very unhealthy—and have seen many sufferers from visiting it even for a day. The Natives who dwell near the Lake, are subject to frequent attacks of Fever, Ague, and Spleen, as I am informed.

A. 13. Water is supplied from private Tanks and Pools. Some of the Tanks contain very good water; others indifferent; but the majority very bad. There are no public Tanks, and towards the close of very hot seasons, when the preceding rains have not been so abundant as usual, the distress of the poorer Natives is very great. The subject has been brought to the notice of Government, in the very strongest terms, by the Intally Conservancy Committee, but without effect.

A. 14. With the exception of a few, and only a few, private Tanks, all the Tanks in Intally are covered more or less with green scum, or luxuriant vegetation.

A. 15. I believe it does not undergo any filtering or other preparation, beyond passing it, occasionally, through a dirty cloth.

A. 16. I have not.

A. 17. Most of the Tanks and Pools and the Ditches and Drains of Intally are overhung by trees, the leaves of which fall therein, decompose, and engender Malaria; which is distributed by the winds all over Intally, and even into Calcutta. The Drains, Ditches, and Tanks of Intally are fruitful nurseries of Malaria. The Conservancy Committee, do all that their means enable them to mitigate this evil, and have applied to Government for the means of doing more.

A. 18. I can give no information on this subject, worthy of confidence; but I believe the Magistrate of the 24-Pergunnahs can, or the Surgeon of the Suburbs, Dr. Strong, who possesses much information on these, and other local subjects

No. VIII, Samuel Smith, E 22nd June, 1841.

A. 19. About one-third of the Native Inhabitants are Mussulmans, I am informed.

A. 20. There are several Mahommedan Burying grounds in the district; but they also bury their dead occasionally in their own Gardens, and near their Musjeeds.

A. 21. The Mahomedan Burying grounds are not well taken care of, and are at times very offensive. They are considered a sad nuisance to the neighbourhoods in which they are situated.

A. 22. There are Christian burial grounds on the Circular Road, North Road, Sealdah, and Tiljullah, all for Roman Catholics, I believe, unless perhaps the last.

A. 23. The Conservancy of Intally has for the last four years been under the charge of a Committee, appointed by Government, who have done much good; but the means of the Committee are small; the extent of the district is considerable, embracing from the Dum-Dum Road on the North, to Ballygunge (*not* inclusive) on the South; the Salt Water Lake on the East; and the Circular Road on the West. The Roads, with few exceptions, are cutcha; the Drains all cutcha, without system or levels, and there are but about 60 convicts and 20 carts to repair all these roads, and clean all the Drains and Ditches. The principal Roads and Drains are kept in pretty good order, the others are, more or less, neglected for want of labourers. The subject is now before Government.

A. 24. I think the Draining of the Lake would have the most beneficial effect on the climate of Intally, and of Calcutta also. Perhaps, while under process of Draining or Warping, much sickness might prevail about and near the Lake, but eventually, the benefit would be very great.

A. 25. My own personal experience does not enable me to reply; but from communication with several old Inhabitants, I learn that within 20 years, there have been three stages of healthiness, and the reverse.

1. Good—when Mr. Elliott was Magistrate, and 500 convicts were employed in making roads and keeping them in repair, and cleaning the Drains, and cutting down Jungle, (5 years).

2. Bad—when in after years, Intally was neglected, and the convicts reduced to 60 or 70, and the Magistrates left the Roads and Drains to the care of the Overseer, almost entirely, (10 years).

3. Good again—or approaching to it, when the Roads, &c. came under the Civil Engineer, and eventually under the Honorary Committee, who have now charge of them, (5 years).

The Intally Canal *was* a serious nuisance: *now* it is not so, except at the head of it near the Circular Road, as already stated; but this evil is daily decreasing, since the Canal has been under Captain Boileau's charge, and also a communication has been opened through the Circular Canal with the River, and into the Salt Water Lake.

SAMUEL SMITH.

22nd June, 1841.

No. VIII. *b*
Mr. T. Wilson.

No. VIII. *b*.

Answers by Mr. T. Wilson, to the same Queries to which Answers were requested by the Committee upon the Fever Hospital and Municipal Improvements from W. C. Blaquiere, Esq.—Vide pages. 21 to 24.

Answer 1. I have lived many years in the Suburb of Entally, forty-two in the house, South Road Entally, and three in the present, which is situated in Baneepooker.

A. 2. About a mile from the Canal, and two from the Government House.

A. 3. My house is in a lane. It has a Garden attached to it.

A. 4. Yes, many; and generally speaking, there are too many trees and underwood in the Suburbs. "The Bagheechas," as they are called, are no better than Jungles. In many parts the branches of the Trees completely shade the Roads, and prevent the rays of the sun from penetrating and drying them; and in the rains, the drippings from the leaves keep the Roads in a wet state.

A. 5. Although the climate is the same, yet, I consider Calcutta healthier. I except those spots where there are dense Native populations.

A. 6. To its efficient Conservancy, to the improvements which are daily being made to every part, which add to the means of comfort, and consequently to the health of the Inhabitants.

A. 7. Yes, much more so than Calcutta,—and these fogs are caused by the numerous filthy Tanks and Ponds. For some time my attention has been directed to the state of these Ponds. In my division, though the smallest, yet, not the less populous, every piece or parcel of ground has one or two of these Ponds or Pits, which hold stagnant water during many months in the year. There must be upwards of a thousand of these Ponds in my division.

I have endeavoured to persuade the Inhabitants to fill them up; to convert the spaces now occupied by these stagnant Ponds into gardens; to plant vegetables for sale.

As the greatest part of them are Tradesmen, who earn their living in the City, who leave their homes at 9 A. M. and return at 5 P. M. These could easily command an hour or two in the mornings, and an hour in the evenings, to attend to their gardens, and by such means would better their circumstances (whereas, now, they generally spend their evenings in the Toddy or Arrackshops.) But the reply is, we cannot plant vegetables. Give us the Earth, and we will fill up the Ponds. Why cannot you plant vegetables? Because Goats, Swine, Cows, and Tattoos will come and destroy them. But you can easily prevent them by fencing off the spots? We are too poor to do that. You can send the Cattle to the Pound or to the Thannahs? We cannot do that, the Pound and Thannahs are not convenient to go to. We do not remain at home, we go to work, our wives and Daughters cannot take the Cattle to the Thannahs: if they did, it would be at the risk

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of being beat and abused by the owners of these Cattle. Who own these Cattle? Eight out of every Ten belong to the Chowkedars.

It is, I fear, with great truth that this charge is brought against the Pounding System. The present mode of Pounding Stray Cattle is exceptionable, on account of the trouble and disadvantage attending it to the sufferers, and is seldom resorted to. Were the parties who suffer their Cattle to run on their neighbour's property, besides being severely fined, made to pay to the sufferers the full amount of the property destroyed by their Cattle, and the Peons attached to the Conservancy Establishment, who are constantly employed in their respective Divisions, also directed not to suffer any Cattle to stroll about the Streets and Lanes; it would, I think, be a means of preventing the loss of much productive domestic labour to the community.

To furnish available means to the industrious and well disposed classes, is a matter of great consequence. Destitute as these people are, of the means of improving their condition, and labouring under many prejudices, the lessening of their troubles is an object worth attending to. Thus many are kept poor and idle; and Idleness is the parent of want, and of many diseases.

Considering of what consequence it is to the health of the Inhabitants, that these stagnant Ponds should be filled up, and the advantage the poorer classes would obtain for bettering their condition, if the difficulties attending the present Pounding System were removed, I have taken the liberty to mention what I consider as out of place; but I trust the Municipal Committee will not take it amiss, but use their influence in suggesting such means as will remedy the evil.

A. 8. From April, to the end of July—that is, after the strong winds have blown away the infectious matters—though it is then warmer, yet the Season is more healthy.

A. 9. Fevers prevail to a great extent. The Dysentery, Spleen, Influenza, &c. &c.

A. 10. The Cholera rages with dreadful malignity from January to April, when a considerable number of the poorer classes of the Inhabitants fall a sacrifice to this malady, and many die for want of timely assistance.

Without losing sight of the finger of God, to whose decree alone this visitation must be traced, several circumstances may be mentioned, which, humanly speaking, greatly aggravate this evil. The changes in the weather, from heat to cold; exposure to the Night Air; the eating Fish caught in the Stagnant Tanks and Ponds; the using a greater quantity of Acid Fruits, such as Tamarinds, Plumbs, Green Mangoes, &c. &c.; the drinking copious draughts of brackish water direct from the Tanks, when warm and perspiring; all which tend to injure the digestive organs.

Also cases of severe Bilious attacks occur, occasioned from exposure to the Night Air, at their Weddings and Feasts, which generally take place in this season of the year, and on which occasions the Natives are not very abstemious.

A. 11. The Canal formerly was considered a great nuisance, as it then emitted a very offensive smell: but in its improved state it is far from being so. The inconvenience at present felt, from the stench arising from the filth and silt which collects near the late Mrs. Howard's premises, could be avoided if greater attention was paid to the part where it now collects; and if encouragement was given to the Dealers in Chunam, to settle near the part, in the room of the Wood-sellers, who at present occupy the Banks.

A. 12. The Salt Water Lake has long been noted as occasioning sickness: but not hav-

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ing made personal observations, I cannot tell how the spots near it are affected by the flux and reflux of the tide. From inquiries on the subject, I have learned from others, that all the spots near it are injurious to health; that intermittent and remittent fevers prevail in its neighbourhood.

A. 13 Many Tanks in Entally contain good water; but the distress experienced from the want of Public Tanks, particularly in the hot season, is inconceivable. The extent of the distress may be judged from the following facts:

In the hot season, when the Tanks get very low, the owners of these Tanks, who had hitherto allowed their Native neighbours water from their Tanks, are compelled to stop the supply, from fear of losing their fishes, and of being deprived of it for their own domestic purposes; water being an indispensable article of life to a Native, and their drink being only water, words are inadequate to express their grief on the occasion At first they flock in numbers to the gates of the places where they were in the habit of getting water; use intreaties and cries for admittance; but cries and intreaties avail not; they are driven away. They then go into the interior, and fetch water from Tanks which are surrounded by trees—water on which the beams of the Sun never play, and which of course must be very unwholesome—and by drinking this brackish water, subject themselves to many diseases.

It is generally known that, when a person has been in the habit of using water from one particular tank, if he drinks it from a different tank, he suffers for it; hence the reason of the care that many take, of having their water always from the same Tank.

Another circumstance which demands consideration is, that this duty of procuring water for domestic purposes generally falls to the lot of the females of a Native family—many of whom are great sufferers, by being obliged to leave their infants behind.

Permit me, therefore, to submit to the Committee, the propriety of their recommending a more considerate attention to this domestic comfort. The whole pecuniary expense for this benefit will be but a trifle, compared to the pleasure and satisfaction the Government will feel, in being able to contribute to the preservation of the health of multitudes. It will draw forth the gratitude of the Native Population, and convince them, that, while their Rulers, are generously seeking to improve their mental comforts, their domestic comforts are not disregarded by them.

Ground for excavating Tanks could be purchased cheap, the price of land being very low at present, but central spots should be fixed upon for the purpose, that the Inhabitants, living in the interior, may also enjoy the benefit. Should the Government be prevailed upon to remove this grievance, so generally felt, by giving the Inhabitants four or five Tanks, I trust it will be such as becomes them.—Large Tanks, with large open Squares, to which suitable names might be given, such as Auckland Square, Eden Square, Ryan Square, Grant Square, &c.

Another very great advantage would be obtained—a large quantity of earth would be available for the purpose of filling up the Stagnant Ponds, &c., which the Inhabitants would gladly do themselves, as the spaces now occupied by these Stagnant Ponds would be recovered for many purposes, and many of the Cutchah Roads could be raised.

A. 14. None free from green scum and vegetation.

A. 15. Few keep it overnight in Culsees; but the greatest part drink it direct from the Tanks.

A. 16. The Lightning is frequent and severe; whether the Cocoanut, Bamboo, and Plantain trees attract it, I cannot tell. In many instances I have seen it fall on these

trees. In June 1839, Nine Cocoanut trees were destroyed by one flash, the sight was fearfully sublime!

A. 17. To many circumstances; such as the great quantity of leaves—which, falling into the Drains, decay and putrify. The falling of the leaves into the Drains is occasioned by their being, in numberless places, overhung with trees, which not only branch over the Drains, but the Roads also.

To noxious exhalations, arising from the Tanks and Stagnant Ponds, which, in the dry season, present a bare surface, covered with rank weeds undergoing putrid fermentation.

I have noticed that, after a very hot day, if there should be a North-Wester in the evening, and with it some rain, the water in the Stagnant Ponds during the Night, gets heated to such a degree, as to destroy the fishes in them. Next morning they are seen floating on their backs near the sides of the Ponds—when these stinking fishes are taken up, and used as food by the Natives.

To Woods and Trees, which in many places are so very thick, as to appear like Jungles; the consequence of which is, that the beams of the sun being thereby hindered from penetrating to, and warming the soil, the soil becomes damp; the air confined; and the vapour arising from the ground so corrupt, as to affect the whole atmosphere.

This evil, I am sorry to say, is increasing. The Natives consider this a good way to mark and increase the quantity of their lands; and is, I fear, the cause of many litigations: were only an eighth of the trees left standing, and the rest cut down by the owners themselves, abundance of fruit and profit would result; and a most beneficial change would take place in the Physical condition and aspect of the place.

To the number of public and private Musselmen Burying Places.

To the putrid exhalations from the filth and impurities from the European and Native Tanneries, which run into the Drains, and accumulate,—and which the Convicts will not clean out—which matter assuming unremoved, a putrescent action, is extremely prejudicial to the health of the Inhabitants.

To the water in the Drains becoming stagnant, for want of a free course.

To the effluvia arising from human ordure. In the Suburbs, the Maturs never convey the filth to the River; nor do such of the Natives who have necessaries, ever keep them clean: but as their necessaries have a communication with the drains, the filth runs into them.—But the major part have no necessaries.

A. 18. The population is numerous; what the exact number is, I cannot tell, not having time and means to take an estimate. The yearly ravages of the Cholera is decreasing the population very much. The Births fall far short of the deaths. Those living in the interior have families, but mostly those living near the City, live in a state of Adultery.

A. 19 There are many Musselmen families at Entally; but the Hindoos form the great body of the population; there are, on an average, two Musselmen to three Hindoos.

A. 20. At Gobrah, Ballygunge, Suldee Mullah, Ballygunge, Curbullah, Teeljullah, Tallpooker, Subgache, Manic-Tullah, Causee-Baughan, Tangrah, Googoodungah, besides a great number of private burying places.

A. 21. Yes. In the Mahomedan burial places, where many of the bodies being scarcely covered by the earth, are constantly dug up by the Jackalls—and the very surface of such spots become a mass of corruption, and contaminate the Air.

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A. 22. In Seealdah, Teeljullah, &c. &c.

A. 23. The want of proper Drains, I mean such Drains as will give the water a free course downwards, and not only carry off the water from Entally, but the water from the South-Eastern parts of the Town; and the want of a sufficient number of hands to clean out the Drains is severely felt. Formerly upwards of five hundred Convicts were employed on the Roads and Drains; now about sixty and seventy. The Drains should be cleaned out at least twice every week; whereas they are cleaned only once in the year; some once in two years: and all the Drains near the Tanneries, never. The consequence is, that rank weeds grow in them; stagnant water and filth, &c. remain in them, and emit a very offensive smell.

The present Roads are extremely narrow, winding, and wretchedly laid out, and are become much worse, from encroachments that have been made on them. Out of the many, seven only are Puckah, and that, not throughout; the rest are all Cutchah: many are little better than ditches, causing, in the rains, great inconvenience to foot passengers, who force their way through these miry Lanes; and many are obliged to make a great turn, to go a short distance.

It has long appeared very surprising, that the conveniencies, and local situation of Entally, have not been properly considered. While the Town has been improving with that ardour characteristic of the British nation, this place, situated as it is so near the heart of the "City of Palaces," and only a few minutes' drive to all the Public Offices, Marts, &c., should have remained, with few exceptions, stationary so long. The reason why it does not proceed in improvements is, that the Landlords, or Owners of Houses, experience very great difficulty in recovering their rents. The law as regards Landlord and Tenant is different here; the same facility for recovering rent does not exist as in the Town. Here a Tenant may occupy a House for months, and not pay a pice of the rent; leave it when he chooses, and laugh at his Landlord. Many Landlords have shut up their houses, verifying the proverb, "Better an empty house than a bad tenant." Others have pulled down their houses, sold the materials, and let the Land out to Ryuts, at low rents.

As long as this disadvantage to the Landlord continues, I fear the attempt to Tax the Suburbs will be a fruitless job. The trifle that will be collected will not pay the expenses for collecting it. It will also affect the price of Land, already deteriorated in value, and check all improvements; as, no doubt, many who intended building residences for their private use, on their Lands, would perhaps give up the idea of doing so.

A. 24. It would make the Suburbs more healthy. Many Thousand Beegahs of land would be gained for Agricultural purposes, and many lives and property saved from destruction by land spouts. I remember instances of three; the one in April 1838 was severe, when upwards of one hundred lives, and much property were destroyed.

A. 25. As far as my experience, and the testimony of many who have lived several years here, prove a material change to have taken place; the change, at first imperceptible, has gradually increased. The improvements in the City have operated to increase the unwholesomeness of the Suburbs. The Native population of the City has, in a great measure, been obliged to retire, and add to the numbers that were already in the Suburbs, and all the impurities attendant upon such a population, destitute of all cleanly habits, have been added. The connection there is, between malignant diseases, and dirtiness, is very well known. Open fields have been converted into Jungles, whereby a free circulation of air has been retarded. High spots of Land have been changed into Marshy and Stagnant Ponds, occasioned by the Brick merchants.

Besides all these circumstances, there are others I could mention ; but let these suffice. After what has been stated, can any person attribute the Insalubrity of Entally to its climate merely? Certainly not—Then there must be a cause. If there be one, remove it, and the effects will cease: and pray do not let the mere circumstance of a Ditch running between, act any longer as a cause why the Inhabitants of the Suburbs of Entally should be deprived of their health, and domestic comforts.

No. VIII. b. Mr. T. Wilson, 15th April, 1841.

15th April, 1841. THOS. WILSON

No. VIII. *c.*

Answers by Mr. M. Crow, *to the same* [illegible] *to which Answers were requested by the Committee upon the Fever Hospital and Municipal Improvements from* W. C. Blaquiere, Esq. *Vide pages* 21 *to* 24.

No. VIII. c. Mr. M. Crow, 18th May, 1841.

A. 1. I have been a resident of Soorah in the Suburbs of Calcutta for 9 years, and a Member of the Intally Conservancy Committee for 4 years ; the Division under my charge extends from the Intally or Balliaghattah Canal to the Dum-Dum road, and my experience is limited to this locality, within which I have made observation on several of the points embraced by the Queries.

A. 2. My present residence is 400 feet to the North of the Balliaghattah Canal, and nearly 3,000 feet from the junction of the Circular Canal.

A. 3. My house is situated near a Metalled road, and in the midst of a Garden.

A. 4. There are a good many trees around my house.—With the exception of the extensive Paddy fields along the Salt Water Lake which is a perfectly open tract, this part of the Suburbs is thickly studded with trees of all descriptions.

A. 5. I consider the above locality to be healthier than the thickly Inhabited parts of Calcutta.

A. 6. I ground the above opinion upon personal experience and observation. My family, consisting of five Children from the age of fourteen to the age of one year, as well as of individuals in the prime of life and in advanced age, has enjoyed, generally speaking, much better health since my residence in the above place than it did when residing within the Town. My observation has shewn that at times when the Cholera Morbus is raging, the disease is neither so extensive nor so violent in its effects here as within the City, and this I attribute to the debilitating effects of heat being in this locality comparatively less.

A. 7. There is certainly a great difference between the climate of Calcutta and of this place. In hot weather this is less oppressive than the Town, owing, I believe, to the number of Pucka-houses in the Town, which must produce much heat by reflecting the rays of the sun. In cold weather also it is colder, with a greater degree of fog. On the whole, in my opinion the advantages are on the side of this locality.

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Mr M C w
18th May, 841

A 8 From the month of March, to the month of September, I consider to be healthier than the remaining months

A 9 From the month of October to the month of February, Ague and Fever prevail in this locality, and when this disease is not soon subdued by bark or any other febrifuge, it often terminates in spleen, which among the poorer classes and their Children especially is very common. Acute fevers generally terminating in a fatal collapse, called by the Natives "Beegar," also occur Some of these cases I have seen cured, when apparently there was no hope of life, by the administration of "Bisburrey," a Native preparation from Arsenic and other poisonous substances

A 10 I recollect in November, and December, 1839, this place was visited by an epidemical fever preceded by ague, and the patients generally recovered in 4 or 5 days In a few cases however th[redacted]body suddenly subsided, the pulse sunk, and with some exception, in which a [redacted]was brought on by the stimulating powers of the "Bisburrey," the sufferer died, Bark or Quinine producing no effect But I have had no opportunity of observing the effects of professional treatment in these cases

A 11. I have never heard that the accumulation of Silt in the bottom of the Balliaghatta Canal, which is now a running stream, has produced any effect upon the health of the Inhabitants in its vicinity

A 12 Since the commencement of the Survey which under the orders of Government, I am now carrying on along the borders of the Salt Water Lake, I have had opportunities of observing the appearance of this locality and of its Inhabitants Many of these people appear to have suffered at some period of their lives by the spleen, and many complained of fever and ague caused as they expressed it, by the Saltness of the Lake, but amongst these people I also observed several well made athletic Individuals and some who had attained to the age of 60 and 80 These latter I generally questioned and found that they had passed their lives in the neighbourhood of the Marsh For a considerable distance, between the deep parts of the Lake and the high inhabited grounds the country is alternately under water and dry causing in most places a very unsightly slime and emitting disagreeable effluvia. Further on towards the East, the Lake is deep enough to cover the ground even in the dry months The flux and reflux of water in these Marshes is caused throughout the year by the tidal influence of the Sea through the channels of the Sunderbuns and the Circular Canal and in the rains by the overflowing of the streams and Drains which pour their contents over these low lands

A. 13 Tanks are the only source whence this part of the Country is supplied with water, many of these contain fresh and wholesome water; but some are putrid, and must be unwholesome. Towards the Salt Water Lake the Tanks are brackish, and the Inhabitants are obliged in consequence to resort for their supplies to distant parts

A 14 Perhaps one-half the number of Tanks are not free from green scum and floating vegetation, but these do not always corrupt the water I have drank from Tanks completely covered with "Pana" very fine water, whilst in other instances I have met with putrid Tanks without any "green" vegetation on them

A. 15 No process of filtration, except it be of a simple cloth which is sometimes used, is ever employed by the poorer classes.

No. VIII. c. Mr. M. Crow. 18th May, 1841.

A. 16. Compared with Calcutta and Bengal generally, I have observed no peculiarity regarding electricity and other atmospheric phenomena in these parts. In April, 1837, I hear of a most violent current of wind having passed over a belt of the Marsh and its neighbourhood, which carried before it every thing it met, and caused great destruction of life and property

A. 17. In the months of October, November, and December, the common effects of vegetable fermentation, viz. heat, smoke, and disagreeable odour from accumulations of vegetable substances exposed alternately to moisture and to the sun, are often met with; but my experience has not enabled me to trace the prevalence of any disease to these causes.

A. 18. I have at present no means whatever of forming even an approximate idea of the amount of the population in these parts; but as my Survey (which will extend to the whole of the Suburbs from Tolly's Nallah to Barnogore) progresses, I take down notes in a Tabular form of the number, &c. of the Inhabitants, and on other statistical points of information; and will perhaps be able, at the end of my present labours, to give correct information on these points.

A. 19. Mussulmans are found in every part of the Suburbs; but their number, &c. I cannot state until the completion of my Survey. The proportion of Mussulmans to Hindoos may be as 5 to 10.

A. 20. Casiah Bagan, and Kurbullah in Manicktollah, are the principal Burial places of the Mahomedans; but they also bury the dead on their own grounds, and near their Musjeeds.

A. 21. I am not aware of any facts connected with public Cemeteries as a source of disease.

A. 22. They have three Burial Grounds, one at Boitakhannah on the Circular road, one near the Balliaghattah Suspension Bridge, and a third on the North road Intally; to these all the poor Christian dead (Roman Catholics) both of Calcutta and the Suburbs are carried. The Chinese have a burial ground on the Chingreyhutta road, and the Parsees one on the Balliaghattah road.

A. 23. Nothing can be in a more deplorable state than the Drainage throughout my Conservancy Division; most of these channels for the exit of rain water are completely blocked up for want of hands to remove from them the vegetation of years, and the accumulation of mud. In consequence of this, almost the whole country is under water during the rains, and it is not until the rains have ceased for some months that these localities become dry. If the diseases prevailing during the cold season are to be attributed to Malaria arising from decaying vegetation, this must be considered as the chief cause of it. The Intally Conservancy Committee have scarcely ever so many as one Hundred convicts at their disposal for the Conservative care of all the Cutcha and Pucka Roads and all the Drains, &c. throughout their District, which extends from Kuroiah near Balligunge to the Dum-Dum Road. For such an extensive district, 500 convicts or coolees would not be too much, and until some radical improvement is made in this respect, the Conservancy of these Suburbs must continue in a wretched state.

No. VIII. c. Mr. M. Crow, 18th May, 1841.

A. 24. The Draining of the Salt Water Lake, would in my opinion greatly improve the climate of Intally, not only by removing the unwholesome effluvia arising from extensive tracts which are alternately exposed to the action of the Salt Water and the Sun, but also by converting Salt Marshes into wholesome culturable fields and garden grounds. The opening of the Circular Canal into this Lake has caused a great alteration for the better; the fresh water entering this channel from the River has not only considerably reduced the salineness of the Intally Canal, and those parts of the Lake which border upon it, but has also assisted in filling up parts of the Lake itself by the sediment which it has deposited in all the places to which its current has extended. The process of filling up is constantly in progress in this Lake by the decay of vegetation, and a variety of other causes which have for ages formed some of the strata of the Gangetic delta; but these natural causes must take a very long time to effect the filling up of this Lake; and it would certainly be a great boon to the country if the slow progress of these natural causes were to be assisted by some judicious artificial means, such for instance, as that proposed by Lord William Bentinck, of warping the Lake by the admission of water from the river when it is loaded with sediment during the rains.

A. 25. During my residence here I have always found the climate of Intally such as I have described it; but I hear from old Inhabitants that the climate in the vicinity of the Intally Canal has considerably improved since the opening of the Circular Canal. The cause in my opinion for this change is the agitation which the water in the Intally canal (formerly altogether stagnant) now receives by the flux and reflux of the current flowing through it from the River, by means of the Circular Canal.

18th May, 1841. M. CROW.

No. IX.

No. IX. Major W. N. Forbes, Engineers, 13th Aug. 1841.

To THE HONBLE. SIR J. P. GRANT,
Chairman of the Fever Hospital and Municipal Improvement Committee.

SIR,

In compliance with the request conveyed by your Letter of date the 22nd of April, and referred to in a Letter from J. Morris, Esq. (the Clerk to the Committee), of date the 1st of June, I have the honour to forward Answers to the series of Questions proposed in the printed paper which accompanied your communication.

2nd. I regret that the occupation of my time, by Official duties, not admitting of postponement, has put it out of my power to furnish these replies at an earlier period.

I have now the pleasure of returning the printed Lists of Queries, and the Papers transmitted to me noted in the margin.*

* Municipal Committee's Report with its Appendices D. and G.

I have the honor to be,
Sir,
Your most obedient and humble servant,
W. N. FORBES.
Major Engineers.

CALCUTTA MINT,
August 13th, 1841.

No. IX. *a.*

No. IX. Major W. N. Forbes, Engineers 10th Aug. 1841

Answers by Major W. N. Forbes, (Engineers) to the Queries marked No. I. and No. II. to which Answers were requested from Captain A. H. E. Boileau, by the Committee upon the Fever Hospital and Municipal Improvements.—Vide page 1 to 12 of this Appendix.

A. 1. I believe the description given by Captain A. H. E. Boileau, of the Circular Canal, and of the Entally and *Baliaghatta* Canals, the *latter* communicating at its Eastern end with the Canal and Channel passing through the Salt Water Lake, to be correct.

A. 2. As the Canal *has been* formed through the Salt Water Lake, it certainly would not now be expedient to incur the expense of excavating another channel round the Lake through the *ground* to the Southward, in the direction proposed by Lord William *Bentinck*. I believe the Canal was formed through the Lake in place of the more circuitous direction indicated in the plan inserted opposite page 47 of Appendix (G,) principally with reference to considerations of economy; it having been ascertained that without affording superior facilities for the Drainage of the Town, or of the Lake, the *circuitous course,* (partly from its passing through *Salt Works and property that would have required to have been paid for,*) would have been far more expensive than that adopted.

It will be seen (in page 41, No. VI. B. 2.) of Appendix (G,) that Captain John Thomson, (of the Engineers,) then *Superintendent* of the *Canals*, (and a Member of the Committee, who on the 11th of January 1834, reported on the simplest means of Draining and Warping up the Salt Water Lakes,) *estimated* that, (exclusive of the cost of Damming up four Nullahs,) the total expense of embanking *the Canal across the Lakes*, so as to answer both for Drainage and for towing path purposes, would have been 20,000 Rupees. The *proposal* for carrying the Canal circuitously to the Southward of the Lakes, appears partly to have been based on the assumption that the direct line could only be provided with *such embankments* at an expense greater than that of excavating the comparatively *long* and deep Cut *round*—an assumption that the estimate now referred to, and the circumstance previously mentioned of the value of the property the long line would have intersected, as moreover the fact that the direct line was ultimately sanctioned *as the cheapest*, sufficiently disprove.

The practicability of constructing, at a moderate expense, such towing paths, or embankments, is, I observe, further established by the reply of Captain A. H. E. Boileau to the 3d. Question* of the series under review; in which he states, that the "towing "paths of the Salt Lake Channel scarcely deserve the name, and might be very much "improved if the Superintendent of Canals had leisure to turn his attention to them." A representation further strengthened by his remarking, that "the improvement, or rather "perfecting of the present rude towing path *along the Lake Channel by converting it* INTO "*a* CARRIAGE ROAD *for five miles between Baliaghatta* and *Bamunghatta*, might perhaps "cost 40,000 Rupees, or 8,000 Rupees per mile."

* NOTE.—Dated the *11th of February* 1841.

It may be noted, that this estimate for a *carriage road* parallel to the Canal across the Lake, being a work of greater magnitude than the mere low towing path embankment (of greater length) estimated for by Captain Thomson, appears quite as moderate.

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Assuredly the facility with which such works could be formed on the existing *line of Canal* was in some degree overlooked by Lord William Bentinck, when (as in the 9th paragraph of his Minute, page 3, Appendix (G,) he alludes to *its* passing "*through an* "*open Lake*, only to be kept open by the use of a dredging machine, and not having " the benefit of a lateral embankment, except it be made at a considerable expense."

It is however known, that Lord William Bentinck, looked at, or surveyed, at least once, the Salt Water Lake, an experiment which the statements furnished by some of the parties, afterwards consulted on the subject of its Drainage, afford neither internal nor other evidence of their having *hazarded*. Being now the only survivor of the Committee (consisting originally of Mr. J. Prinsep, Captain John Thomson, and Captain Forbes,) who in 1834. were directed to Report on the Lake Drainage, I deem it not unnecessary to state, that, as concerned the question referred to the Committee, Mr. J. Prinsep was fully in possession of the views entertained by his brother, the late Captain Thomas Prinsep, (of Engineers) the *former Superintendent* of the Canals; and that as Mr. J. Prinsep, (who had for some time officiated in *this situation*,) was likewise well acquainted with the localities , and further, that as Captain Thomson was *at the time* the Superintendent of Canals, and, as such, familiar with all details and affections of the Lake; and moreover, that as he was aware that, holding this appointment, he would, if the works proposed were sanctioned, be ordered to Superintend their execution ; it will be seen that, at least as far as concerns these parties, the Committee was so constituted as to embrace the best practical information obtainable on the matters brought under discussion ; neither, it may be observed, were the principles of operation, unanimously assented to, submitted by the Committee until all the Plans and Papers bearing on the subject had been studied, and the Canals and Lake carefully examined.

It was known that the portion of the Canal passing through the Lake stood in need of towing paths, which could most easily and cheaply be formed by embankments ; economy which then (as ever since) required to be held in view, possibly, in part, led to the conclusion, that there could be no very serious objection to making the embankments, stood in need of for towing paths, (and the construction of which was desirable as the means of augmenting toll profits,) also answer for the purposes of Draining and Warping up the three Swamps, which, being at certain periods united, have here been alluded to, as one Lake.

The general principle of the plan proposed by the Committee in their Report of date the 11th of January 1834, (see page 38, Appendix G,) appears to have been principally objected to by Col. Sir Thomas Anbury, on account of its *brevity*, as in the course of his Minute he adverts to an old plan of his own, virtually based on the same principle, and which he additionally describes as nearly similar in some of its details. The description and explanation of *the details* of the Committee's Plan, as also the preparation of the Estimates, were in the first instance undertaken by Captain Thomson, who, as Lieutenant Colonel Craigie has noticed, would, from the appointment he held, have been likely to have been employed in the execution of the work proposed, and who certainly would have been willing to have held himself responsible for its success.

From Colonel Galloway's Minute, (page 44, Appendix G,) it appears, that the plan proposed by him recognised the correctness of the principle of operation recommended by the Committee, and in fact that his plan merely proposed effecting by portions, and by separate detailed embankments, and sluices, what the Committee had considered could be more economically effected by those running parallel to the Canal across the Lake, and at the same time serving as towing paths.

By the plan facing page 46, Appendix (G,) it will be seen that the embankment proposed by him from the letter A. (at Baliaghatta,) to the letter H, (at Jurrool,) would, if conducted from A. along the Northern bank of the Canal, have formed an embankment,

and also a towing path, along the entire portion of the Canal called in the plan, the "*Lake Channel.*"

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It will further be seen, that had the embankment been carried in this direction, and of merely the same length and dimension as from A. to H. it would have additionally included the central portion of the Lake, situated between the village of Jurrool and that of Hatgatcha.

Neither will it be overlooked, that it was with this view, and as enabling the largest portion of the Lake to be warped up at the least expense, that the Committee recommended that one of the embankments, (there also serving as a towing path,) should be conducted along the Northern side of the Lake Channel.

In this site, and on the Southern side of the Canal, *such towing paths* as had been raised, would have formed part of the embankments proposed by the Committee. Colonel Galloway appears to have remarked, that "the Scheme presented by the Committee is "chiefly confined, save the Feeder to the process of *Draining* the Lake, not of Warping," but it will be perceived that the 3rd Answer in the Committee's Report in reply to the Question, "the best mode of executing the work," states, that it would be "*by embanking out the Salt "Water, as above described*, and by providing sluices for the discharge, at ebb tide, of "rain water or of alluvion-charged* water admitted by the Canal, *and by a feeder*, join-"ing the Hoogly and the upper end of the Lake, *for the purposes of irrigation, of ameliora-"ting the soil*, and of *raising the Level of the Lakes by Warping*." *From this* and from the circumstance of the Estimate accompanying the Committee's Report, having included (see page 44, Appendix G,) the sum of 70,000 rupees as the cost of cutting, and of forming bridges and sluices on the proposed feeder (or Canal); as further, from the fact of 800 beegahs of land required as the site of the feeder, having been estimated at 4,00,000 rupees, it will be seen that the Committee did not fail to direct particular attention to the most essential part of the subject of Warping.

As Lieut. Schalch, (page xxii, 2nd Appendix D. of volume Appendix G,)† states, that previous to the formation of the Circular Canal; "the only *direct* communication between "the River and Lake (was) by the Mahratta Ditch, from Chitpore to Saumbazar bridge, "and the Ditch on the side of the Dum-Dum road to the head of the Lake at the two "bridges near Saumnuggur;" and as‡ Mr. Blechynden, (2nd Appendix D. to volume G. page lxxv,) also writing previous to the cutting of the Circular Canal, further states, it is true that the River water enters at Chitpore Bridge, and passes through the Chitpore Nullah into the Mahratta Ditch, and thence through *various outlets* to the Lake, it will, with reference to these statements, and to the fact, that previous to the opening of the Circular Canal, the Town Drains aided by the alluvion-charged water thus obtained from the River, annually carried down to the Lake an immense mass of mud and sediment, be perceived, that the cutting of this *Canal* (forming a receptacle for these desposits, and serving to transmit both them, and the alluvion of the River water entering it either into the Lake Channel, or down to the deeper channels below it,) in reality greatly retarded a process previously in progress for filling up the Lake, in fact an operation closely allied to Warping.

† Appendix to Appendix G, page xxii.

‡ Ibid p. lxxv.—J.

On this point Captain Thomas Prinsep, (see Memorandum dated the 16th of February 1830, page 21, Appendix G,) remarked, "that the Lakes if left to themselves, "would in the course of time fill up of their own accord, and that such process is now in activity is confirmed by the rapid increase of vegetation within my own knowledge."

* Note.—This should rather have been "water that had been charged with *alluvion*, but which had deposited it in the Lake."

(*Signed*) W. N. FORBES.

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And in confirmation of this fact, D. Stewart, Esq. M. D. (see Evidence, dated 28th of July 1836, page 151, Appendix D) observes, that "not more than forty years ago "the Salt Lake was much nearer to Calcutta than at present. At a village called "Ramkisonpore, a mile from the high road leading to Dum-Dum, is a mound or tumulus "of about thirty feet in height, surmounted by two venerable peepul trees, from either "of which, if ascended by help of a ladder, a magnificent view of the surrounding "country, and of the Lakes' whole expanse may be had. This mound which retains "its native name of Dum-Dumma, not forty years ago was on the edge of the Lake; "it is said to have been raised by the Burmese or Mug traders, who frequented the port, "and used to anchor their boats at this place. The Lake has now receded nearly a mile from "its foot, and the whole circumference has been gradually contracting in a similar way for "many years." Dr. Stewart also mentions, (page 153, Appendix D,) that "encouragement "having been held out by Government of long leases, within the last twenty years, much "land has been redeemed from the margin of the Lakes.

Regard being had to these circumstances, and to facts, either noticed in the Evidence, collected by the Municipal Committee, or by other means placed beyond doubt, it cannot but be inferred that the beneficial process of filling up the Salt Lakes was in a great measure put a stop to by the formation of the Circular Canal; this partly by its having diverted from them the great annual deposits carried down by the Town Drains situated to the Northward of the Durrumtollah Street, and partly from its having closed up the old Chitpore Nullah, which previously, by "various outlets," admitted from the Hoogly a body of water charged with alluvion.

It moreover is evident, that this injurious effect, in place of having been remedied, would have been augmented, if Lord William Bentinck's plan* of carrying "the new Circular Canal round the Lake, and as close to it as possible," had been adopted; inasmuch, as thus conducted, it would have additionally excluded from the large portion of the Lake lying to the Southward of the present "Lake Channel," all the deposits of the Town Drains proceeding from Chowringhee, and from the portion of the Town of Calcutta, situated to the Southward of the Durumtollah Street.

In paragraph 10th of His Lordship's Minute† above referred to, he states, that "In "consequence of the height of the Freshes in August and September exceeding the sur- "face of the lower part of Calcutta by near 6 feet, and the adjacent plains between "7 and 8 feet, it was necessary to erect lock gates at the mouth of the Canal. This "precaution would not be requisite if the Canal was cut over the dry Land, and "the sides raised to a level if thought more secure, of the banks of the Hoogley "itself. I consider these locks to be objectionable, inasmuch as when shut, they produce a "suspension of the current, and a consequent deposit of silt.—It may be expected that "this process of silting up, so great in the Entally Canal, and in the adjoining part of "the Lake, may be much diminished, when by the New Canal the tides will ebb and "flow daily, and that during the rains there will be a more rapid current. This will no "doubt be the case in the overland cut, and I think it not impossible that the bottom of the "new cut, by the effect of the scouring of the water in its confined channel, may be "brought to the same depth as the Hoogley at one end and the Creek at the other, or "between 15 and 20 feet at low water." Now on this it may be observed, that had an *unlocked*, embanked, or "overland" cut of this description been made, the water freely entering it from the Hoogly, in the freshes alluded to, would most certainly have

* See page 2, paragraph 9th of His Lordship's Minute, Appendix

† Dated the 2nd of February, 1830

so raised the Level of the Circular Canal or the upper portion of the Cut, where it was entered by the Town Drains, as not merely to have stopped their discharge, but further to have made them convey into the lower divisions of the Town, such a body of water as would, during the time of high water, have kept them completely inundated. Had it not been thus proposed by His Lordship to have left the entrance of the Circular Canal forming the head of the "overland cut" without a *lock*, the assertion met with in the 10th paragraph of his Minute,* "that the continuation of the Circular Canal will not in any way "affect the Drainage of Calcutta," would have been nearly correct. But as in the same paragraph, he remarked, that "the Drainage of Calcutta has always been an imperfect "operation," and concluded the sentence by observing, "The question does not belong to "this paper, and I will only generally say, that I think it susceptible of very great im-"provement," it may perhaps fairly be surmised that His Lordship did perceive that the construction of the Circuitous unlocked Canal would have necessitated the adoption of a totally different System of Town Drainage.

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* Page 4, Appendix G.

From the 6th paragraph of Sir Thomas Anbury's Minute, (page 49, Appendix G,) it appears, that he also had a perception that some kind of change of the System of Drainage would be expedient. The entire paragraph is thus expressed: "On the Drainage of Calcutta "as referrible to the filling up or reclaiming the Lakes, I conceive it has nothing to do, since "the Canal runs between the Town and the Western extremity of the Lake, but, on that "head, I should say, that a new *grand tunnel* or *trunk drain* should be constructed to "carry off all the Drainage of Calcutta towards Tolly's *Canal*: but that is quite another "question."

Here, adverting to what has been stated of the discharge of silt or sediment from the Town Drains entering the Circular Canal, and to the supplemental fact, that, with reference to the evidence given by Captain Thomson,† the total annual discharge of such silt from all the Town Drains cannot be estimated at less than 1,600,000 cubic feet, I deem it necessary to note, that in place of its being a matter of little importance *whether this amount of annual deposit* were carried into the Lake or past it by "a *grand tunnel* or trunk Drain" into Tolly's Canal, as the paragraph quoted would seem to imply, it, in fact, is in the highest degree desirable, that the silt in question should solely and exclusively be deposited in the Lake.

† Pages 67 and 72, Appendix D.

Were the great deposit treated of, carried into Tolly's Canal, by the means proposed by Sir Thomas Anbury, it could but have the effect of speedily rendering that valuable Channel useless for Navigation, but were it on the contrary conducted into the LAKE, it is almost obvious, and may fully be proved, that it would be one of the most beneficial appliances that could be brought in aid of any plan adopted for Silting or Warping up the Level OF ITS BED.

In illustration of this point it may be observed, that the great Feeder proposed by Captain Thomas Prinsep, (see pages 21 and 22, Appendix G,) and which is of the same description as that of which the cost was reported on by the Lake Committee, was estimated by him as calculated to convey from the Hoogly to the Lake, from the 15th of June to the 15th of October, 10,800,000 cubic feet of water per day. "The proportion of "sediment in the water of the (River) Hoogly at this season is, (he remarks) at present "unknown," but he subsequently observes, "it will bear no proportion with that in the water of the Ganges."—Now bearing in mind that at the period alluded to, an exceedingly erroneous opinion was entertained respecting the amount of alluvion or sediment borne by the Ganges water, a circumstance rendered evident by Lieut. Schalch's having represented,‡ "that some idea may be formed of it when" (he) stated the fact, "that in the rains the "stream" (the Hoogly branch of the Ganges being alluded to.) "carries with it *one-fourth* "of *its* bulk of *sand*," as also from the corresponding misconception of Major Hodgson,

‡ NOTE.—See page 21 of Appendix A. I. to Appendix G.
§ Vide Appendix to Appendix G. page xxi. J. M.

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(then Surveyor General of India,) that in the rains the Ganges at Rajmahl* "rushes "on impetuously with an increased depth of 32 feet, *and charged with sand and mud "to the extent of one-fourth part of its volume.*" With reference to this error, Dr. Stewart observes, (page 147, Appendix D) "The absolute quantity of mud carried down by the "Ganges, and discharged by it along the coast, has been variously estimated. By "Rennel it was said *to be* 1 *part to* 4 *of water:* the extravagance of which estimate has "been forcibly shown by Lyell." Dr. Stewart further refers to "observations made "by the Reverend R. Everest, at Ghazeepore in 1831, and repeated the following year "during the rainy months;" observations which (as will be seen in the 1st. *volume* of the JOURNAL of the Asiatic Society, page 241,) proved that "the solid matter there discharged "by the Ganges was but $\frac{1}{856}$th. part of its bulk," and as, in concluding the account of the experiments that led to this result, the Reverend Mr. Everest has done me the favor to remark, that "in comparing these observations with some previous "ones (he) was glad to find that (his) average for the rains of $\frac{1}{856}$th part in bulk is "nearly the same as that obtained by Capt. Forbes, viz. 2 cubic inches in 1728 or "in 1 cubic foot." I deem it advisable to note that the experiments which led to the conclusion last mentioned, were made by me on the water of the great Ganges, (or Pudma,) between Surdah and Jaffiergunge (I think) in the year 1817; and that they were brought to notice in a Report, then furnished by me, on the *bunds, or embankments,* of the adjacent Rajshahee district; thus with a view to demonstrating the *inexpediency* of maintaining at great expense a line of upwards of 50 miles in length of these *works,* they having in reality but the pernicious effect of turning off from the extensive neighbouring inland Jheels and low Levels, the immense mass of fertilizing alluvion that even at the rate of 2 inches in the cubic foot of the water excluded, it was shewn would by the removal of the embankments have been admitted. Though this Report *thus adverted to a point of* much importance as concerned the Warping up of the Salt Water LAKE, viz. the quantity of alluvion obtainable for that purpose from the River water, it does not appear to have been referred to by Lord William Bentinck, or any other of the parties who wrote Minutes on the subject of ITS treatment.

* NOTE.—See page lxxii. E. 13, Appendix G.

Indeed the early filling up of the Lake being the object in view, it was obviously more convenient to take for granted that the River water contained $\frac{1}{4}$th of its bulk of alluvion, than to have instituted experiments which might have terminated by proving that, in lieu of $\frac{1}{4}$th *part,* less than $\frac{1}{800}$th. part ought to have been recorded. It being noted, that in "Ale and Beer measure" 864 pints make a Butt, it is sufficiently clear that the issue to have been submitted to trial was whether a Butt of the Hoogly water contained one quarter of Butt of mud, or merely $\frac{1}{864}$th *part, which, being* $35\frac{1}{4}$ cubic inches, is, as it happens, exactly a pint or $\frac{1}{864}$th part of 30,456 cubic inches, the total number of cubic inches in a Butt.

Assuming then, the quantity of alluvion in the Hoogly water to be 2 cubic inches in a cubic foot, which it assuredly does not exceed, it will be found that in the course of 4 months or 122 days, in the rains, the feeder estimated for by Capt. Thomas Prinsep, (pages 21 and 22, Appendix G,) would, at the rate of 10,800,000 cubic [feet] per day, have admitted from the Hoogly to the Lake (122 days 10,800,000 cubic feet) 1,317,600,000 cubic feet of water, which, at the rate of 2 cubic inches in a cubic foot, would in the 4 months have deposited 1,525,000 cubic feet of alluvion; further, it will be perceived that as "*during the remaining* 8 *months* the *Hoogly water contains no alluvial*† *matter,*" this would also have been the *annual* deposit from the feeder.

† See Captain T. Prinsep's Minute.

It has been above observed with reference to the evidence of Capt. John Thomson, that the total unobstructed annual discharge of silt or sediment from the Town Drains would be 1,600,000 cubic feet, and it hence appears that as this annual amount of deposit

rather exceeds that derivable by means of the feeder from the Hoogly water, it is at least as important to the filling up of the *Lake* that the Drain deposits should be conveyed into it, as that such a feeder should be formed.

Were the conjoint means of filling it up here alluded to, brought fully into operation, it will be seen that the *annual deposit* might be estimated at (1,600,000+1,525,000=) 3,125,000 cubic feet; and taking the area of the Lakes requiring Warping up to the depth of 2 feet to be 18 square miles, we are enabled to arrive at the conclusion that the period which would be required for the completion of the process would be 321 years.

It will moreover be seen, that if in the calculation the 1,600,000 cubic feet of silt or sediment brought down by the Drains were excluded, the time that would be occupied by the Feeder alone in filling in the Lakes (or Lake) would be 658 years.

The operation would in either case be greatly accelerated by the annual growth and decay of aquatic plants and vegetation in the Lakes, which would assuredly far more than compensate for the portion of silt brought down by the Town Drains, that (as some of them lead to the River) could not be conveyed into the Lakes.

With reference to these, and other considerations, I have to state in reply to the 1st sub-division of Query II, that no benefit would accrue to the Navigation by carrying a Circuitous Canal through dry ground to the Southward of the Lakes in place of leaving it, as now, in comparatively a straight line through them. Neither in reply to the 2nd, 3rd, and 4th sub-divisions of the same Query (II), do I think that either the Drainage of the Lakes or the Warping of them up, or the Drainage of Calcutta, would be facilitated, but the contrary, by the construction of such a Canal.

The evidence which has been referred to shews, I conceive, that the filling up of the Lakes has been materially retarded by the formation of the present Circular Canal; this partly from its having served to exclude from them much of the silt of the Town Drains, and partly from its having cut off the connexion which formerly existed between the Lakes and the alluvion-charged water of the Hoogly by the old Chitpore Nullah, and other outlets; evils which would only have been aggravated if the Circular Canal had been carried, as proposed by Lord William Bentinck, to the Southward of the Southern Lake, a site in which it would have conveyed into the deep water channel at the South-East end of the Lake, nearly all the Sediment of all the Calcutta, Chowringhee, Intally, &c. Drains, as well as whatever alluvion-charged Hoogly water was admitted into the head of the Canal at Chitpore; and it has already been shewn that the consequence of leaving this head without a Lock would have been the Inundation of the lower part of the Town during high water in the River for four months of the year, this in a manner that would have rendered it necessary to have changed the general direction of the Town Drainage, either (as proposed by Sir Thomas Anbury) by carrying it into Tolly's Nullah, or as mentioned by other parties, by conducting it into the Hoogly.

As however by either of these alternatives, all the alluvion admitted from the Hoogly water, and all the deposits of the series of Drains adverted to, would have been sent past, or away from the Lakes, in place of into them, it appears sufficiently evident that the construction of the Circuitous Canal could in no way have facilitated the filling in of the Lakes; but, on the contrary, would have been most essentially at variance with its early accomplishment.

A. 3. I believe the detailed information given in reply to this Query by Captain Boileau, to be correct.

His proposal for the "improvement, or rather perfecting of the present rude towing "path along the Lake Channel, by converting it into a carriage road for 5 miles between "Balliaghatta and Bhamunghatta," I have already adverted to; and I have only further

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to observe, that if the embankment required for such a road were conducted along the South side of the Canal, as was part of the plan of the Lake Committee, it could there easily be rendered subservient to the Warping up of the Southern portion of the Lake, which lying for three-quarters of the year *most to windward* of Calcutta, ought *I think to be* FIRST silted *up*; a measure that, it may not be unimportant to note, could with comparatively great rapidity, be effected by the construction of the Central (brick-rivetted) Canal and System of Sewerage proposed by me; works which would directly conduct into this Southern portion of the Lake nearly the entire deposits of the Drains of Calcutta, Chowringhee, Intally, Balligunge, &c. and which (from the Canal and Sewers being lined with masonry) would admit of the alluvion-charged water of the Hoogly being passed through them with a velocity far exceeding that any mud banked channel, or feeder, could bear;—a consideration that I conclude must accidentally have been overlooked by the unmedical authority, who talked of their STAGNANT Batavian unhealthiness.

When by these means the portion of the Lake adverted to had been reclaimed, the sediment of the Drains, and the Hoogly alluvion-charged water, could be passed under, or across the Lake channel into the portion of the Lake lying to the Northward of IT, where, retained by an embankment, *then formed* along the Northern side of the Lake Channel, they would in like manner (but more slowly from the greater extent of this part of the Lake,) produce a similar effect.

It will be observed that the measure described would carry the process of Warping up (contrary to what has hitherto been proposed) from the Southward to the Northward, a mode of proceeding, which, it appears to me, would be advisable, in as much as it *is not the Northern* but the SOUTHERN *portion* of the Lake that is most commonly found to windward of Calcutta. This mode of proceeding would also prevent the possibility of the Drainage of the cantonment of Dum-Dum,* and of the numerous villages adjacent, being impeded in a way likely in the rains to lead to their inundation, and consequent unhealthiness, by the admission of water from the Hoogly to the Northern extremity of the Lake for the purpose of submerging and *first* raising adjoining subdivisions of it, a measure which it is certain would render the contingency adverted to, by no means infrequent, if it has correctly been represented in page 11, Appendix G, of the Evidence, that the average "Level of Dum-Dum is as low as that of the lowest part of Calcutta."

Having referred to notes written in the year 1833, or about the period the Lake Committee's Report was in the course of preparation, I find that the matter of subdividing the Lakes by minor embankments was not then overlooked, but was omitted in the Report with reference to the consideration that attempting to lay down the precise position of such embankments would at once have given rise to a number of questions, or lawsuits, concerning the right of property in the ground, and relating to the fishings, salt works, passable boat channels, &c. connected with the *Lakes*, which (as it was then believed, there was a serious intention of commencing operations) it was considered might best be taken into consideration after the main, and in reality alone essential, embankments, those proposed along the sides of the Lake Channel, had beneficially been brought into action.

Other parties regardless of this contingency, appear to have recommended beginning with little embankments in the very quarters where they would have been most certain of giving rise to interminable litigation, viz. at, and around, the Northern extremity of the Lake, or, (as on other grounds I have been induced to consider it,) at the wrong end.

* The necessity of forming a new channel to the Eastern Lake for carrying off the Drainage water from Dum-Dum, is adverted to by Captain Thomas Prinsep, with reference to the proposal for commencing the Warping up of the North-Western Lake at its Northern end.—W. N. FORBES.

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By the adoption of the course recommended by the Committee, the generally good effect of Warping up would have been well advanced before its progress reached the debatable or marginal lands, which, if first set to work on would probably have been found fruitful, but of vexatious and injurious delays.

Although that Committee's Report has been somewhat ungently criticised by Reporters, who professed not to understand it, there appears to be very general accordance in the opinion, that whatever else is done with a view to ameliorating the condition of the Lake, its Central Channel should, as suggested by the Committee, and as now recommended by Captain Boileau, be embanked.

A. 4. With reference to Query IV. I am of opinion that deepening and widening the present Lake Channel to such an extent as would render it by means of embankments and towing paths conveniently suitable for the purposes of Navigation, would not, on the plan proposed by me, be injurious to the Town Drainage; neither do I think that the enlargement of the Channel would materially interfere with the Drainage or Warping up of any portion of the Lake. Such widening and deepening would certainly in no way affect the silting up of the portion of the Lake lying to the Southward of the *Lake Channel, by the* Town Central Canal, side Sewers, and Hoogly water above alluded to, as the water transmitted to the Lake, having there deposited its alluvion, could still be allowed to discharge itself by the Byah Nullah, and other, untouched, deep Eastern outlets.

A. 5. This Query has virtually been answered by the opinion offered in reply to the three preceding questions.

No deepening or widening of the Lake Channel, supposing it (as it ought to be) embanked along its Southern side, could affect the system of Town Drainage suggested by me.

A. 6. I think that if the Canal entering the centre of the Town, forming part of the Plan or System referred to, were constructed, it would early be frequented by as many Saltees or small boats as it could conveniently accommodate.

A. 7. In reply to this Query, and with reference to Captain Boileau's answer to it, I have first to observe, that, if, as alluded to by him, "the Circular Canal were continued " behind Entally and Ballygunge into Tolly's Nullah at Bowaneepoor, which would form " a new line of Navigation 3¾ miles long, and would cost perhaps four lakhs of Rupees, " including all the necessary bridges and a large lock, but exclusive of the purchase of " ground," such a work would most materially interfere with the System of Town Drainage proposed by me; inasmuch as the extension of the Circular Canal would, if that system were carried into effect, receive the contents of the Town Drains, this in consequence of its being interposed between their main outlets and the Southern portion of the Lake, which, otherwise, their silt, added to alluvion derived from the Hoogly water, would have the effect of Warping up to a Level, adapting it for cultivation.

Additional space for the boats now crowded into Tolly's Nullah and the Circular Canal might be provided by placing such a large Lock as has been mentioned by Captain Boileau, at a spot in the vicinity of the Eastern end of the Balliaghatta Canal, *where*, being employed to keep the water in this Canal, and in the Circular one, nearly at the level of high water in the Hoogly, *it* would, by occasioning in these a considerable additional *depth of water*, proportionally increase their surface breadth, and consequently accommodation for boats.

The adoption of this plan, would, however, only be conveniently practicable after the

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Central system of Town Drainage had been opened, as then a portion of the water thus kept up in these Canals, so as to form an united *Reservoir*, might be allowed to flow from *it* into drains occupying the site of the Town Drains now entering the Circular Canal, but Drains then having (with a much greater fall) their bottoms so sloped to the Westward as to carry their contents into the covered side sewers running parallel to the brick-rivetted Canal passing centrically through the Town. Were it found (necessarily after far more deliberate investigation of all the details bearing on this point than I have it now in my power to bestow,) that the adoption* of such a plan would be practicable, it would have the highly beneficial effect of rendering to a considerable extent unnecessary the Steam Engine power proposed in my former Reports to be employed in throwing River water, by means of superficial aqueducts, into the upper or shallow ends of properly sloped and rivetted Town Drains; as with the River itself on the West side of the Town, and with the Circular Canal-tide elevated Reservoir described on the East side, it is obvious, that, without having recourse to Engine power, the River water could always twice a day, for a couple of hours, or for a time, before and after high water, be made to flow in large quantities from the circumference of the Town through a series of Drains such as have been shown in the sketch of Central Drainage, but having their upper ends sufficiently low, with their falls sufficiently great, to ensure their contents being carried quickly into, and rapidly through, the comparatively much lower covered side sewers of the Town Central Canal.

A. 8. I believe the statements made by Captain A. H. E. Boileau, in answer to this Query are generally correct, but I have found (and read,) Mr. Cardew's paper in the page indicated by the Query.

A. 9. In addition to the replies above given, in one of which I have explained the grounds on which I consider the cutting of a Canal from Entalee to Bhowaneepoor objectionable, I have only to state that, in conjunction with Colonel McLeod, of Engineers, I several months ago, prepared and forwarded to Government a Report on a line of Canal extending from Mirzapore on the Hoogly to Rajmahl on the Ganges, and which, accompanied by a carefully surveyed Topographical Plan, and by levelling sections, made with the utmost precision, showed that such a work would be easily practicable, and unquestionably profitable; partly from its affording the greatest possible facilities to the water communication between Calcutta and the Ganges, and partly from its serving to convey at cheap rates to either of its extremities, Coal, Iron ore, Stone adapted for building, and making roads, and other Minerals found adjacent to its course; viz. the Eastern base of the Rajmahl range of hills. This Canal having also been planned with a view to supplying water for the purpose of irrigation; the report further pointed out that it would enable large tracts of land, now lying waste, to be brought into profitable cultivation, this whilst its permanent navigability would enable their products such as Indigo, Sugar, Tobacco, Oil seeds, &c. to be cheaply conveyed to the great export outlet—Calcutta.

* The adoption of this plan would also have the beneficial effect, by allowing an escape, through the Durrumtollah Drain, of the water in the Intallee Canal into the *Eastern* covered *side* sewer of Major Forbes' Central Canal, of removing a very *serious* and much complained of evil, viz. The stagnation which exists in the Intallee Canal, especially at its head or Western end, where the water is frequently perfectly putrid.

The noxious exhalations which arise at the head of this Canal, have ruined the health of many, and even believed to have caused the death of some, of the several Inhabitants who have resided in the immediate vicinity of the above locality. The above plan would also dispense, whilst it might allow of more room for Boats, with the necessity for the large Cess Pool or Silt Bason at the head of the Intallee Canal, and at the same time prevent in the Canal itself, the present great deposit of Silt, which it is stated necessitates the Canal being dug out every 4 or 5 years at an average *annual* expense, including the emptying the Silt Bason, of about Rs. 1,500.—J. M.

31*st Dec.* 1841.

No. IX.
Major W. N. Forbes,
Engineers, 10th Aug.
1841.

No. IX. *b.*

Answers by MAJOR *W. N.* FORBES, *(Engineers) to the Queries marked No.* II. *to which Answers were requested from* CAPT. *A. H. E.* BOILEAU, *by the Committee upon the Fever Hospital and Municipal Improvements.—Supra page* 5.

2nd Series of Answers.

A. 1. *Draining the Lowest levels* of the Salt Water Lakes, *apart from Warping them up*, would only be possible by Steam Engine power.

Having spoken to Captain Boileau, respecting that part of his reply to this question, which states, "I do not see any reason to doubt the practicability of Draining the Salt "Water Lakes, though I do not think the execution of it to be advisable." I find he means by it, (as is also explained by his Answer to the 4th Question of the Second series,) that he does not think it would be advisable to attempt "*Draining*" the Lakes in *contradistinction to* "*Warping them up*," an opinion in which I concur.

In addition to the means of Warping up the Lakes by means of the Silt of the City Drains, and the alluvion of the water of the Hoogly admitted by the Central Drainage Canal proposed by me, and described in the replies given above, I conceive it would only be advisable to have straightened, widened, and in some places embanked, all the natural channels met with between Chitpore and the Powder Works at Ishapore, found, *during the season of inundation*, *partly* open from the Hoogly to the Northern end of the Lakes, this in conjunction with making the most Northerly of these channels pass through the main Drains of Dum-Dum and those of the adjacent villages, a measure that *carefully managed* might be made the means of improving their Drainage, by carrying a current of water through their principal outlets, and thereby sweeping into the Lakes nearly all the Silt either now periodically filling in these Drains, or serving to render them injuriously stagnant.

Were this suggestion adopted, the natural *channels* adverted to, would gradually enlarge themselves, and progressively convey to the Lakes the successive masses of earth and alluvion detached from their bottoms and sides; a process by which the Lakes would gain, as regarded Warping up, the benefit of the total cubic contents of the enlargement of the channels.

The progress of this process (necessarily regulated near the upper ends of the channels by sluices) would however require to be cautiously attended to, as it would obviously in time, have a tendency to conduct into the Lakes a greater body of the Hoogly water than would be desirable.

Compared with the expense of purchasing ground, and of excavating, bridging, sluicing, &c. a feeding channel of 200 square feet section, (estimated at four lacks of Rupees,) the cost of this mode of proceeding would be inconsiderable.

The proprietors of the ground on which the channels had enlarged themselves would, of course, be *entitled* to abatements of rent in proportion to the quantity of surface land abstracted; but as the paddy cultivation, and that of many other descriptions of crops would be benefitted by the freer admission of the alluvion-charged Hoogly water, it is probable this plan would, in *practice*, be found incomparably the cheapest method of effecting the admission of the mud-yielding water required.

Some of the Hoogly outlets or Channels alluded to, are exhibited by the sketch

No. IX.
Major W. N. Forbes, Engineers, 10th Aug. 1841.

plan furnished by the late Mr. Kyd, and found in the evidence facing page lxxxiii, (1)E. 15. Appendix to Appendix G.

Of course the operations adverted to concerning them, could only be beneficially carried into effect after the present Lake channel had been embanked; the embankment on the Northern side being provided with rivetted waste wears, over which the Hoogly, &c. water would flow into the Lake Channel after the water had deposited its alluvion.

A. 2. Nothing proposed by me *here*, or in the replies above furnished, would be in the slightest degree injurious to the system of Central Town Drainage recommended in my former evidence.

A. 3. Having attended Meetings of a Committee at the Government House on the subject of the Canal proposed by Lord William Bentinck, at the time he first brought it forward, and when he was Governor General, I no more approved of it then, than I do now. I conceive its construction would be utterly at variance with the proper Drainage of Calcutta, and that *ultimately*, or previous to his sanctioning the present Lake Channel and works connected with existing Canals, he must himself have arrived at a conclusion somewhat similar.

I do not find that after adequate consideration any Engineer in this country approved of his Plan; nor, with reference to the circumstances under which it was proposed, can I imagine there could have been any other than a predisposition to approve of it, if possible.

A. 4. I believe that by the means above described, or by various means, the Warping up of the Salt Water Lakes would not be difficult, and that it would in *every way* be advisable.

A. 5. Having above explained the manner in which it has appeared to me the Warping up of the Lakes could best be effected, I have only supplementally to observe, that I feel disposed, for reasons previously mentioned, to leave the planning and arrangement of the Minor Lake embankments to Revenue Officers, and the provisions (if such exist) of the law.

To save time in discussions relating to them, and for other reasons, I think it would be advisable to commence with the essential parts of the General Plan, embanking* the present Lake Channel, and facilitating the admission to the Lakes, from all possible quarters, of Drainage silt, and River alluvion.

A. 6. The looseness of the banks of the present Circular Canal would certainly not admit of its being employed to any great extent (*principally* depending on velocity of current) as a feeder. The Lake Committee *additionally* proposed a feeder from the Hoogly, having 200 square feet of section, a work in these replies repeatedly alluded to. In the reply to the 2nd Query of this, the 2nd Series I have pointed out the means by which the construction of such a costly channel, or Canal might be rendered unnecessary.

A. 7. I think that *rivetted* waste-wears, log-dams or overfalls, may, with advantage, be almost totally employed in place of sluices; it is however worthy of note, that sluices were considered *necessary* by Captain John Thomson, a Member of the Lake Committee, and then Superintendent of the Canals, and who it is well known was most intimately acquainted with the Local affections of the Lakes.

* This measure it will be observed was approved of by Col. Craigie, by Sir Thomas Anbury, and by Col. Galloway. Capt. Boileau, the present Superintendent of Canals, now recommends its adoption; nor will it be overlooked that it formed a part of the Plan of the Lake Commitee not pretended to be misunderstood.

No. IX.
Major W. N. Forbes, Engineers, 10th Aug. 1841.

A. 8. I have already in various preceding replies, explained how I consider it would be advisable to admit the alluvion-charged River Water, and I have referred to portions of the Evidence, which prove, that its free admission is not of more importance than having conveyed into the Lake all the Silt of all the City, Dum-Dum, &c. Drains.

A. 9. I am of opinion, that the double fall afforded by the Central system of Drainage proposed by me, will be found indispensable to the effectual or healthful Drainage of the City and Suburbs.

A. 10 If the Central system of Town Drainage were adopted, all the Mud and Silt of the Town Drains would be kept clear of the Circular Canal, and be carried where (in place of doing mischief) it is required, into the Salt Water Lakes.

A. 11. I believe the *arithmetical* statements given in reply to this Question, by Captain Boileau, to be correct.

A. 12. I have often heard that the accumulation of filth alluded to, was considered a cause of great unhealthiness by the Inhabitants in the vicinity of the Entally Canal.

A. 13. The Salt Water Lakes present a dreary and desolate series of Marshes, laid more or less under water according to the state of the Tide and the season of the year. They are interiorly intersected by innumerable small Creeks, some of them of considerable depth communicating with the Lake Canal Channel, by about 30 small and 4 large outlets, which by reference to the Lake Committee's Report, page 38, No. VI. (B.) and to their Estimate, page 41, No. VI. (B 2.) (Appendix G.) it will be perceived, they recommended should be embanked, so as to afford (as is required) Towing-paths for the Canal, so as to exclude Salt Water from the Lakes; and so as to retain in them, until it has deposited its alluvion, (therefore so as to progressively Warp them up,) whatever Water charged with the Silt of the Town or that of other Drains, or with the mud and fertilizing contents met with in the freshes of the Hoogly, can be conveyed into them.

The fearful Insalubrity, if not Pestilentiality, of the alternately wet and dry surfaces, and vicinity of these Lakes, compared with that of rice cultivation *in Bengal*, had I conceived, been set at rest by the higher rate of Mortality they had been ascertained to induce.

It may however be hoped, that scepticism on this point will not lead to retarding their amelioration, and thereby to the perpetuation of evils, such, as under similar circumstances, Providence generally permits man the sense and energy to avert, if not from himself, from posterity.

I have the honor to be,
Your most obedient servant,
W. N. FORBES,
Major, Engineers.

CALCUTTA,
August 10th, 1841.

No. X.

No. X.
Col. W. N. Forbes, Engineers, 18th June, 1845.

Question put by the Committee upon Municipal Improvements, to Colonel W. N. Forbes, Engineers, and his Answer thereto.

Question. You have stated in your former evidence, that if the Circular Canal were continued behind Entally and Ballygunge into Tolley's Nullah at Bhowanypore, such a work would materially interfere with the system of Town Drainage proposed by you, for the reasons which you then gave, and which appear to the Committee to be satisfactory.

Captain Boileau has stated, that great obstructions are experienced from the number of Boats which lie in the Canal to discharge their cargoes, and that as a very important and perhaps most efficient remedy, he would propose that the Circular Canal be continued in the line above-mentioned, into Tolley's Nullah, which would form a new line of navigation.

If the continuation of the Circular Canal to Tolley's Nullah in the line proposed by Captain Boileau be abandoned, is there any other line which you can suggest for a communication between the Circular Canal and Tolley's Nullah, which would not interfere with the system of Town Drainage, proposed by you; or if not, what remedy would you propose for getting rid of the obstructions complained of, in the Canal, besides the excavating the small Docks here and there proposed by Captain Boileau?

Answer. The obstruction alluded to in the Circular Canal and in Tolley's Nullah, and proceeding from the want of sufficient accommodation for the craft frequenting them, might be remedied by the formation of Boat Basins, or Wet Docks lying in the line that would have to be given to the Circular Canal were it prolonged to Tolley's Nullah, but separated from each other in the situation where this line would be intersected by the Town-drainage Scouring Canal, and covered side Sewers proposed by me.

Thus formed, one of these Basins would answer for the reception of the vessels now impeding the navigation of the Circular Canal, and the other for the reception of the craft often at present stopping, and always retarding, the communication through Tolley's Nullah.

The Basin formed in continuation of the Circular Canal might, during the rainy season, be effectually scoured out by a current admitted into it from the Town-drainage Central Canal; and by the same means, and at the same season, the Basin terminating in Tolley's Nullah, might be similarly treated.

The large Channel of masonry and Sluices thus enabling the Basin connected with Tolley's Nullah to be scoured out, might also be conveniently adapted for furnishing an additional supply of water from the Nullah to the Town-drainage Canal; this whenever the tide in the Nullah was higher than the level of the water in that Canal.

Five feet of water should at all times of tide be preserved in this Basin, as also in the one forming an extension of the Circular Canal; and as this extension would be merely an open (or unlocked) prolongation of the Circular Canal, it would necessarily have the same level of surface.

By the arrangement suggested the "large lock," fitted with two pair of gates, which it was mentioned by Captain Boileau would have been requisite had the Circular Canal been extended as proposed by him to Tolley's Nullah, could be dispensed with, as the land left between the Basins described, and formed into Wharfs in the vicinity of the Town-drainage Canal, would prevent the levels of the Circular and Lake Channel from being affected in the manner intended to be prevented by the large lock.

Having re-examined the levels with a view to ascertaining whether the Town-drainage Canal, and side Sewers, could have been safely carried under the Circular Canal, if the

prolonged portion of it had had its water surface constantly kept up by locks at each end to the level of high water in Tolley's Nullah, I find that the general drainage of the Town could not even by this expensive means have been as uninterruptedly kept up as it assuredly is necessary it should be.

It may indeed further be noted, that even had the prolongation of the Circular Canal been provided with locks adapted for keeping up its surface to the level of the highest tides in Tolley's Nullah, these tides are in the dry months so low, that unless the central Drainage Canal, or at all events its large side Sewers had been made to descend through metal trunks rising again from under the prolonged Circular Canal, the navigation of the latter Channel could not in the dry season have been maintained.

The cost of such metal trunks would inevitably have been very considerable, and from their inverted arch-form, there would obviously have been such a risk of their occasionally getting choked up by the contents of the Sewers as could not safely have been encountered, when the entire Drainage of the Town had been made to depend on the currents passed through them.

Seeing, however, that boats cannot often have occasion to circumnavigate Calcutta, I believe it will readily be admitted that any convenience which could have been derived from their having been enabled to do so would have been dearly purchased if obtained (as it only could have been) in a manner that would have broken the continuous scour through the main Town sewers to the Salt Water Lake.

It may moreover be observed, that under any circumstances the cargoes of boats entering either the Circular Canal or Tolley's Nullah, would have had to have been unloaded, before they could have been transferred to the "Saltees" or small boats adapted for navigating the Central, or Town-scourage Canal.

MINT,
June 18th, 1845.

W. N. FORBES,
Lieut. Colonel, Engineers.

No. XI.

No. XI. Queries, 4th June 1845.

Queries to which Answers are requested by the Municipal Committee, relative to a Canal to Channel Creek and the continuing of the Canal through the Salt Water Lake from Hoseinabad, as proposed by the late Major Schalch.

Q.—1st. Whether Ships could, with any convenience or advantage, proceed from Sea up Channel Creek, there to discharge their cargo for transmission to Calcutta by Boats?

2nd. Whether in the present state of the Trade, and of the Shipping resorting to the River Hoogly, and taking into consideration the use of Steam-tugs, any, and what advantage would be derived from enabling ships to discharge their cargoes at the New Anchorage, or Diamond Harbour, for transmission from thence to Calcutta by Boats through a Canal independent of the higher part of the Hoogly?

3rd. What are the advantages to be expected from continuing Major Schalch's Canal from Hoseinabad to Coolna, in reference to the Trade with the Upper Provinces; and is there any difference at present in the delay, difficulty, and danger of Boats coming from thence by the existing circuitous routes, as compared with the difficulty, and danger, which existed when that Canal was proposed in 1822?

4th. What is the amount of the Trade between Calcutta and Dacca, Chittagong, Sylhet and places adjacent, which is now carried on through the Soondurbuns to Tolley's Nullah; what are the difficulties and dangers of the present line of communication; and what advantages would be derived to this Trade from the completion of Major Schalch's Canal to Coolna?

5th. If a Canal from Tolley's Nullah to Channel Creek, as proposed by Major Schalch, were carried into execution, would the Trade from these last mentioned places, and from which of them, come by it to Tolley's Nullah; and with what, if any, advantages over its present route by the tortuous Channels of the Soondurbuns?

No. XII.

No. XII.
J. Beckwith, Esq.
25th June 1845.

Answers by J. Beckwith, Esq. to the Queries put to him by the Municipal Committee, printed at page 99 of this Appendix, and marked No. XI.

No. 1. Cannot answer this question.

No. 2. In the present state of Trade, as vessels would discharge their cargoes at the New Anchorage or at Diamond Harbour, and as regards the *external* commerce of the country, a Canal from Tolley's Nullah to Channel Creek would be of no use. In 1822 a large portion of the external trade was carried on by the E. I. Company in very large vessels that discharged stock in cargo at Diamond Harbour or Saugor, and a communication between Calcutta and Diamond Harbour or Channel Creek would then have been of great benefit; but now, from the smaller size of the vessels employed, and the greater ease and safety of the navigation from the employment of Steam-Tugs, every vessel comes off Town, and would continue to do so, if there was the most perfect Canal communication to an Anchorage at Diamond Harbour or Channel Creek.

No. 3. The Trade with the Upper Provinces is now carried on by the Bhagaruttee River entirely during six months of the year, and to a great extent during the remaining period; the larger sized Boats only coming through the Soondurbuns in March, April and May: there is not much danger in the Soondurbun route, but the rate of hire of boats is higher in consequence of the greater delay and increased distance. The measures required to facilitate the communication with the Upper Provinces are any of the following:—The improvement of the Bhagaruttee; the completion of the proposed Canal to Rajmahal, or of a Railway to the same point. There is no chance of a Canal from Tolley's Nullah to Koolna receiving any support as a means of improving the communication with the Upper Provinces.

No. 4. Cannot give any precise information as to the Trade between Calcutta and Dacca and places to the eastward.

No. 5. Answered in No. 3.

Calcutta,
25th June, 1845,

J. BECKWITH.

No. XIII.

No. 2033.

To CAPTAIN W. RUTHERFORD,
Superintendent of the Calcutta Canals, &c. &c. &c.

No. XIII. Clerk to the Committee, 5th June, 1845.

SIR,

By desire of the Chairman of the Municipal Committee, (the Hon'ble Sir J. P. Grant,) I have the honor to transmit the enclosed printed Queries, relative to a Canal to Saugor, proposed by the late Major Schalch, and the continuing of his Canal from Hoseinabad to Koolna. and to request the favor of your Answers to them at your earliest convenience. The Committee will also be obliged by your favouring them with a Return of the number of Boats paying Toll, which have entered the Circular Canal for the years 1841-42-43 and 1844, *distinguishing* those which have entered the said Canal from the *Salt Water Lake*, and those which entered it from the *River Hoogly*.

I am also directed to request you to be so good as to state whether the Pucka Road along the North Bank of the Balliahghatta Canal, mentioned by Captain Boileau in January 1841, has been completed, or if not, to what extent it has proceeded.

I beg to enclose for your information, a printed copy of the evidence given by Captain Boileau to the Municipal Committee, in which you will find at end of Captain Boileau's Answer to Query 3rd, notice of the Pucka Road referred to in the above Question by the Committee.

I have the honor to be,
Sir,
Your obedient servant,
(*Signed*) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL,
5th June, 1845.

No. XIV.

No. 16

To J. MORRIS, ESQ.
Clerk to the Municipal Committee.

No. XIV. Capt. W. Rutherford, 28th June, 1845

SIR,

In accordance with the request of the Chairman of the Municipal Committee conveyed in your letter, dated the 5th instant, I have the honor to forward answers to the queries contained in the printed paper No X., which accompanied your communication.

I beg likewise to transmit two* Returns marked A and B, shewing the number of boats paying toll, which have entered the Circular Canal and Tolley's Nullah, for the years 1841-42-43 and 44, distinguishing those which have entered the former Canal from the Salt Water Lake, from those which have entered by the river Hoogly; and in like manner the number of boats navigating the Nullah from the Soonderbunds and from the Hoogly, respectively.

* These Returns are embraced in the Return annexed to a subsequent communication received from Capt. Rutherford, and marked No. XVI. *a.* in this Appendix.—J. M.

No. XIV. Capt. W. Rutherford, 28th June, 1845.

With reference to the Pucka Road on the north bank of the Belliaghatta Canal, adverted to in your second paragraph, the recommendation of Captain Boileau to continue it on to the Salt Lake has not been carried into effect. Three thousand five hundred feet of Pucka Road along this line was completed by Captain Boileau in 1841, and the remaining portion still remains Kutcha for a distance of 5,000 feet to the Toll house on the margin of the Lake.

I have the honour to be,
Sir,
Your most obedient servant,
W. RUTHERFORD, *Captain*,
Executive Officer of Canals.

CALCUTTA,
28th June, 1845.

No. XIV. *a*.

Ditto No. XIV. *a*.

Answers by Captain W. Rutherford, Executive Officer of the Calcutta Canals, to the Queries put by the Municipal Committee, printed at page 99 *of this Appendix, and marked No. XI.*

Answer. I am not competent to speak of the advantages, especially with reference to the safety of ships proceeding up Channel Creek; but from what I can learn on the subject, the general feeling, amongst consignees or shippers of goods, is against ships resorting to that Harbour, from whence they consider the transmission of cargo by Boats to be objectionable.

A. 2. I believe it may be taken as a general rule that the nearer a ship discharges her cargo to the place of delivery, the better; and it may be further admitted that a ship lying off Calcutta is in a safer berth than at the New Anchorage or Diamond Harbour. Taking into consideration therefore the use of Steam-Tugs, I conceive the purposes of a Canal for the transmission of goods from these places to be entirely superseded, as few or no merchants would avail themselves of such a mode of conveyance so long as they can receive and ship goods at once off Calcutta, under the existing steam arrangements.

A. 3. I am only imperfectly acquainted with the locality of Major Schalch's proposed Canal from Hoseinabad to Coolna, but I do not anticipate any benefit to the Trade of the Upper Provinces at all proportionate to the expense its execution would involve. The dangers and difficulties of the existing route, whatever may have been the case in 1822, are now seldom or ever heard of.

A. 4. The only data, as regards the amount of trade now carried on through the Soondurbuns to Tolly's Nullah, which I am able to furnish, is contained in the accompanying return marked B. shewing the number of Boats which have passed through that Channel, between the Soondurbuns and Calcutta in the years 1841-42-43 and 44. It is impossible for me to say what amount of trade has been carried on from the places indicated in the query, as no questions are ever asked at the Toll stations, and no records are kept, from whence Boats have come, or whither they are bound. The Navigation of Tolly's Nullah has been greatly improved in the course of last year by the removal of a dangerous sand bank at its junction with the Kamrapookeriah Khal, where the Nullah

has been deepened four feet, for a distance of 2000 feet westward. I am not aware that any other difficulties or dangers exist on this line, of sufficient magnitude, to render it expedient to excavate the Canal proposed by Major Schalch to Coolna; nor can I speak as to what advantages would accrue to Trade thereby, although I do not think their amount would be in any degree commensurate with the expense likely to be incurred. Ditto No. XIV. a.

A. 5. I have no doubt that many Boats from Dacca and Chittagong would find their way through the proposed Canal from Channel Creek to Tolly's Nullah, but I am unable to say with what advantages over the present route; owing to the very imperfect acquaintance I possess with the line of Navigation proposed by Major Schalch.

CALCUTTA,
27th June, 1845.

W. RUTHERFORD, *Captain*,
Executive Officer of Canals.

No. XV.

No 2042.

To CAPTAIN W. RUTHERFORD,
Superintendent of the Calcutta Canals.

No. XV.
Clerk to the Committee, 2nd Jul 1845.

SIR,

I am directed by the Hon'ble Sir J. P. Grant, Chairman of the Committee upon Municipal Improvements, to request you to favour him as early as possible with a statement exhibiting the amount of Tolls derived from each of the following Canals, viz., Tolley's Nullah and the Circular and the Balleahghatta Canals in each year, as also the expenditure, since the period the Tolls came under the Military Board's management in May or December 1836, up to the current year, specifying the rates of Tolls in each year or changes in the amount of the Toll levied and the dates of such changes, also a Return* of the number of Boats paying Toll which have entered the above Canals during the period they have been under the Board's control, viz., since December 1830, distinguishing those Boats which have entered the Canals from the Salt Water Lake, and those which have entered them from the River Hoogly.

The information respecting the Tolls you will possibly be able to compile from your annual Statement or Account Currents to the Military Board.

I have the honor to be,
Sir,
Your most obedient servant,
(Signed) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL,
2nd July, 1845.

* The Committee desire to complete the Returns of 1841 to 1844, received with your letter to my address of the 28th ultimo.

No. XVI.

No. 24.

No. XVI.
Capt. W. Rutherford, 16th July, 1845.

To J. MORRIS, ESQ.

Clerk to the Municipal Committee.

SIR,

In compliance with the request of the Hon'ble Sir J. P. Grant, Chairman of the Municipal Committee, conveyed in your letter No. 2042, dated the 2nd instant, I have the honor to forward a figured Statement of the number of Boats which have entered the Calcutta Canals, and of the amount of Tolls levied thereon, from the 1st November 1836 to the 30th April 1845, the period which this branch of Revenue has been under the control of the Military Board.

2nd. The Statement exhibits a return of the proceeds for the first half year, viz. from 1st November 1836 to 30th April 1837, and from the latter date annually up to the 30th April of the current year, shewing the gross amount of collections at each Station on the Circular Canal and Tolley's Nullah, as also the aggregate amount of Revenue derived from the Tolls during the whole of the above period.

3rd. In the column of remarks I have inserted the rate of Tollage for each year, which was reduced from one Rupee to eight Annas per 100 maunds on the 1st May 1838, agreeably to G. O. P. C. under date the 24th April of the same year.

4th. Under the head of "Tolley's Nullah" will be found included, the small subsidiary station of Russa, established on the 1st October 1839, which yields an annual Revenue of from 3 to 4000 Rupees from a toll levied on Canoes which ply between the Soonderbund Creeks and Tolley's Nullah, falling into the latter by the Kamrapookeriah Khal without going near either of the principal stations at Panspotta and Kiderpore, and by this means payment of Toll was evaded until a branch of the Panspotta establishment was transferred to Russa at the mouth of the Khal.

5th It will be seen by the returns of the current year, that the Tolls are in a more prosperous state than they have been hitherto, and that the increase has been derived from the Circular Canal alone. This must in some degree be attributed to the passage through Tolley's Nullah having been closed from the month of December to the 3rd of March last, pending the removal of a Sand-bank near the Kamrapookeriah Khal, which occasioned a much greater number of Boats to pass through the Circular Canal than usual.

6th. With advertence to the information required by Sir J. P. Grant, relative to "Expenditure since the Tolls came under the Military Board's management," I shall be obliged by his informing me what expenses are meant to be included under that head, whether it refers to the expense of keeping up the Toll establishment *alone*, or to the *whole Canal expenditure* including the construction of *Roads, Bridges, Docks, &c. &c.* since 1836. If the latter, it will require some time to prepare a correct account, my office establishment being very limited (only sufficient to carry on the current duties,) and the records not in the most perfect state. I shall, however, be happy to supply all the information on the subject that may be within my power to obtain.

I have the honor to be,
Sir,
Your most obedient servant,
W. RUTHERFORD, *Capt*
Executive Officer of Canals and Collector of Tolls.

CALCUTTA,
16th July, 1845.

No. XVI. *a.*

Return* of the number of Boats navigating the Circular Canal and Tolley's Nullah, and amount of Tolls levied thereon, from 1st November 1836 to 30th April 1845.

	Circular Canal.				Tolley's Nullah							
	Dhapa.		Cheetpoor.		Panspotta.		Kiderpoor.		Russa.			
	Boats entered from the Salt Water Lake.	Amount of Tolls.	Boats entered from River Hoogly.	Amount of Tolls	Boats entered from the Soonderbunds.	Amount of Tolls	Boats entered from the River Hoogly.	Amount of Tolls	Canoes entered from the Kamrapookeriah Khal.	Amount of Tolls	Total amount of Tolls, and Grand total, from 1st November 1836 to 30th April 1845.	Remarks.
From 1st Nov. 1836 to 30th April 1837	23,190	34,897 12 6	5,705	9,890 8 0	11,257	36,230 3 3	5,872	26,499 6 0	.. ..	.. ..	1,07,507 13 9	Rate of Toll one rupee [per 100 mds.
,, 1st May 1837 to 30th April 1838.	42,089	73,078 14 0	9,016	17,554 7 0	14,770	43,331 3 6	10,401	26,604 4 6	.. ..	.. ..	1,60,568 13 0	Ditto, ditto, ditto.
,, 1st May 1838 to 30th April 1839	32,919	29,652 15 4	8,430	7,753 4 0	11,546	17,150 5 6	9,509	11,362 8 11	.. ..	.. ..	65 919 1 9	Rate of Toll eight annas [per 100 mds.
,, 1st May 1839 to 30th April 1840	49,919	52,674 8 3	14 312	18,793 6 6	19,500	29,593 15 0	13,200	17,490 11 9	19,882	2,620 8 6	1,21,163 2 0	Ditto, ditto, ditto.
,, 1st May 1840 to 30th April 1841.	69,200	79,067 13 6	17,145	24,357 1 6	23,000	35,359 13 6	15,430	22,517 14 9	26,579	3,687 1 9	1,64,929 13 0	Ditto, ditto, ditto
,, 1st May 1841 to 30th April 1842.	68,830	80,719 11 0	14 960	22,208 10 0	20,990	33,056 13 6	13.915	19.194 2 3	29,045	4,066 0 3	1,59,245 5 0	Ditto, ditto, ditto.
,, 1st May 1842 to 30th April 1843.	67,350	83,784 2 0	12,405	20,825 6 9	26,380	32,165 2 0	12,700	17,419 12 9	33,835	4,561 2 6	1,58,755 10 0	Ditto, ditto, ditto
,, 1st May 1843 to 30th April 1844.	63,930	90 196 5 0	14,090	25,313 15 3	19,105	28,682 7 6	11,850	16.343 2 9	27.455	3,727 0 6	1,64,292 15 0	Ditto, ditto, ditto.
,, 1st May 1844 to 30th April 1845.	68,300	1,04,003 2 9	17,760	34.742 4 0	13,275	22,315 3 3	10,135	13,237 8 9	25,510	3,493 9 3	1,77.791 12 0	Ditto, ditto. ditto.
	4,85,727	6,28,005 4 4	1,13,823	1,81,468 15 0	1,59,823	2,77,885 3 0	1,03,012	1,70,659 8 5	1,62,256	22,155 6 9	12,80,174 5 6	

Canal Office, Calcutta,
15th July, 1845.

W. RUTHERFORD, *Capt.*
Collector of Canal Tolls.

* The Returns previous to the 1st November 1836, will be found printed in Appendix (I) pages 59 to 65 inclusive.—J. M

No. XVII.

No. 29.

To J. MORRIS, ESQ.
Clerk to the Municipal Committee.

SIR,

In continuation of my Letter, No. 23 [24] of 16th ultimo, and with reference to your, No. 2052 of the 21st idem, I have the honor to forward, for the information of the Chairman of the Municipal Committee, a Statement of the annual Expenditure incurred on the Calcutta Canals, from the date on which the Tolls were placed under the control of the Military Board in November 1836.

The monthly current Bills of the Canal Department include the aggregate expences of Tolly's Nullah and the Circular Canal, which are under one and the same management, having an office establishment as well as other items of expenditure, common to both ; and I am therefore unable to furnish *separate* statements of the *whole* expenditure on each respectively, as requested in your letter. But I have done so, as far as is practicable, with regard to the cost of works executed agreeably to separate Estimates.

The discrepancy pointed out in your 2nd paragraph on [in] the two Returns of the number of Boats formerly transmitted by me, I am at a loss to account for ; as the figures in both of my office copies exactly correspond, being 67,350, which, although the correct number, does not accord with *either* of those indicated in your marginal reference, which are 67,360 and 67,550. It is possible therefore a clerical error may have occurred in your office as well as in mine.

I have the honor to be,
Sir,
Your most obedient servant,
W. RUTHERFORD, *Captain,*
Executive Officer Canals, and Collector of Canal Tolls.

CALCUTTA,
5th August, 1845.

No. XVII. *a.*

Return of the Annual Expenditure on the Calcutta Canals, from November 1836 *to April* 1845.

	Estimated repairs of Tolly's Nullah.	Estimated repairs of Circular Canal.	General Current Expenditure, including Establishment, Dredging expences, Petty repairs, and miscellaneous charges.	Total Annual amount Expenditure Canal Department & Grand Total.	REMARKS.
From Nov. 1836 to April 1837..	1,972 12 11	12,611 3 5	13,783 12 7	28,367 12 11	Under the head of General Current Expenditure, the construction of dredging Boats, the repairs of Tow-paths and clearing of Jungle on the Soonderbund Canal, are included, as likewise all other items in the Canal Dept. which cannot be separately returned under the head of Tolly's Nullah or the Circular Canal.
,, May 1837 to April 1838..	.. .. ..	1,711 5 6	20,823 15 11¼	22,535 5 5¼	
,, May 1838 to April 1839..	1,946 14 1	19,594 10 11	27,325 3 4½	48,866 12 4½	
,, May 1839 to April 1840..	591 0 ¾	766 15 0	23,310 11 5¾	24,671 10 6½	
,, May 1840 to April 1841..	739 4 8½	2 651 13 3¾	22,890 0 3	26,284 2 3¼	
,, May 1841 to April 1842..	813 15 5¾	5,209 11 5¼	23,484 12 10¼	29,508 7 9¼	
,, May 1842 to April 1843..	2,004 9 6¾	1,262 11 9	22,903 4 11¼	26,170 10 3	
,, May 1843 to April 1844..	1,852 6 1½	9,014 11 11½	21,852 6 8¾	32,719 8 9¾	
,, May 1844 to April 1845..	3,926 7 10	8,307 7 4	25,518 15 7¼	37,752 14 9¼	
	13,850 6 9¼	61,133 10 7½	2,01,893 3 9	2,76,877 5 1¼	

W. RUTHERFORD, *Capt.*
Executive Officer Canals, and Collector of Canal Tolls.

CALCUTTA, CANAL OFFICE,
5th August, 1845.

No. XVIII.

No. 2073.

TO CAPTAIN W. RUTHERFORD,
Superintendent of Canals.

SIR,

Under instructions received from the Chairman of the Committee upon Municipal Improvements, I have the honor to request that you will favour the Committee, at your earliest convenience, with a Statement exhibiting under distinct heads the Annual Income derived from the Ferries, Fisheries, Fines, Hauts, or Bazars, Soondurbun Canals and Tolley's Nullah Lands, and any other source of Revenue (excepting that derived from Canal Tolls, a Statement of which you have already furnished to the Committee) that may have been, and is now, derived from the Canals under your charge from the earliest period to the present time.

I have the honor to be,
Sir,
Your most obedient servant,
(*Signed*) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL,
The 13th September, 1845.

No. XIX.

No. 2074.

TO M. CROW ESQ.
Officiating Deputy Collector of Calcutta.

SIR,

The Committee upon Municipal Improvements, acting under the authority of Government, will be obliged by your furnishing them at your earliest convenience with *separate* Statements exhibiting the rent derived from the Lands and Hauts, or Bazars, pertaining to the Circular, Balleahghatta, and Entally Canals and Tolley's Nullah and Soondurbun Canals, from the earliest period to the present time.

I have the honor to be,
Sir,
Your most obedient servant,
(*Signed*) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL,
The 13th September, 1845.

No. XX.

No. 198.

To J. MORRIS, ESQ.

Clerk to the Municipal Committee.

SIR,

I have the honor to acknowledge the receipt of your Letter No. 2074, of the 13th instant, and to request the favor of your explaining in detail the nature of the information sought by your Committee.—For instance, there are several Bazars along the Circular Canal, indeed more than half its length is studded with shops ; but the tenure on which these lands are held, is a temporary farming Lease ; the Dan Tolah and other profits of the Bazars and Shops being taken by the farmers.—Does your Committee desire to know the rent paid by this Mehal, which includes not only Bazars and Shops, but Ryutty and other lands also, on the produce of each Shop derived by the farmers? The former information can be easily given, the latter can be obtained only from the farmers, who will do all in their power to mislead an inquirer [any inquiries] into their profits. Were you to state the end for which this information is sought, I might better be able to furnish you with the means of obtaining that end.

2nd. Soonderbun Canals are not under the charge of this Office ; and Tolly's Nullah is so only in part.

I have the honor to be,
Sir,
Your most obedient servant,
M. CROW,
Officiating Deputy Collector.

CALCUTTA,
DEPUTY COLLECTOR'S OFFICE,
The 15th September, 1845.

No. XXI.

No. 2076.

To M. CROW, ESQ.

Officiating Deputy Collector of Calcutta.

SIR,

In reply to your communication, dated the 15th instant, I have the honor to state, that the information required by the Committee upon Municipal Improvements, from your Office, is the amount of Revenue derived by the Government from the Surplus Canal Lands, including Tolley's Nullah, so far as the Lands pertaining to that Nullah are under your charge.

2nd. The Committee do not desire to know what the profits are of the farmers of the Bazars or Shops, or of Lands, but rather what they pay to the Government, in the shape of rent, either for Bazars, Shops or Ground rent. The Committee apprehend that the only Revenue derived from the Lands of the Circular and Balleaghatta Canals, is from the

Ground rent, and not from Bazars, Shops, &c. which possibly in no case have been built by Government, but by the parties renting the Lands. The Committee, however, understand that the same is not the case with respect to the Lands pertaining to Tolley's Nullah, which they learn contains several Bazars, Hauts, or Markets, formed or *erected by* the projector of the Nullah, Col. Tolley, and which, when the Nullah and its Lands came into the Company's possession in 1804, were transferred to the Company, who it is stated, farm them out.

3rd. The object of the Committee is to ascertain the *total* amount of Revenue, from all sources, derived by the Government from the Calcutta Canals and from the surplus Canal Lands. The Committee have been furnished by the Superintendent of Canals and from the Office of the Military Board, with a complete Statement of the amount of Tolls derived from the Calcutta Canals, including Tolley's Nullah, from the earliest period to the present time.

I have the honor to be,
Sir,
Your most obedient servant,
(*Signed*) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL,
The 18th September, 1845.

No. XXII.

No. 3005.

To CAPTAIN W. RUTHERFORD,
Superintendent of Canals.

SIR,

I am directed by the Honorable Sir J. P. Grant, Chairman of the Committee upon Municipal Improvements, to request the favor of your early reply to my Letter to you of the 13th September last, relative to the Revenue derived from Ferries, Fisheries, Fines, Hauts or Bazars and Canal Lands, &c. as the Chairman is busily engaged in framing the Report of the Committee on the Calcutta and Soondurbun Canals, which Report is now passing through the press.

The Committee observe in your Letter of the 16th July last, No. 24, to my address, that you mention that the Toll Station at Tolley's Nullah called Russa, only yields a Toll of 3 or 4,000 Rupees per annum, whereas the Committee notice in a Letter dated the 5th of December 1836, from Captain J. Thomson, then Superintendent of Canals, to the Military Board, that he states "that up to the 12th November 1836, a Toll of 4 annas was "collected from every loaded Boat or Saltee that navigated the Kumapookria Khal, and "the annual produce of this Toll has been estimated at 10,000 to 8,000 Sicca Rupees; that "if the Board are of opinion that the Khal forms or may be considered as a part of "Tolly's Nullah, which it is very necessary it should be, that he will in that event levy a "Toll on the same."

The Committee will be much obliged by your stating whether the decrease in Toll from the Russa Station is to be attributed to a change in the rate of Toll, or to what cause.

The Committee will be further obliged by your informing them, whether the information was ever furnished which was called for in the Military Board's Letter, dated the 25th October 1836, to the Superintending Engineer Lower Provinces, wherein he was directed to call upon the Superintendent of Canals to submit a Section of the Gobra Khal, and a Plan and Section of the Dam which he proposed to construct, and if so, whether any thing resulted in respect to the above subject.

I have the honor to be,
Sir,
Your most obedient servant,
(*Signed*) J. MORRIS,
Clerk to the Committee upon Municipal Improvements

MUNICIPAL OFFICE,
TOWN HALL,
11*th November*, 1845.

No. XXIII.

No. 188

To J. MORRIS, ESQ.
Clerk to the Municipal Committee.

SIR,

With reference to your Letter No. 3005, dated the 11th instant, I have the honor to forward, for the information of the Honorable Sir J. P. Grant, Chairman of the Municipal Committee, a Statement exhibiting the annual Revenue derived from Ferries, Fisheries, Ground Rents, &c. on the Calcutta and Soonderbund Canals, from the year 1836-37, to the 30th April 1845.

2. Adverting to the 2nd and 3rd Paragraphs of your Letter under reply, it does not appear, as regards the amount of Toll taken at Russa, that Captain Thomson's proposal, dated 5th December 1836, to levy 4 annas on every loaded Boat or Saltee that navigated the Kamrapookerea Khal, was ever carried into effect, as it was subsequently reported to the Military Board by that Officer, that nine-tenths of these boats were under 25 maunds burthen, the lowest rate of Tonnage, on which, by the Toll Regulations then framed and still in force, Toll is leviable.

3. It was not therefore until October 1839, that a Station subsidiary to Panspota, was established at Russa, as stated in the 4th para. of my Letter No. 24, of the 16th July last, when a Toll of 2 *annas* on all Canoes or Saltees equal to 25 maunds burthen passing through the Kamrapookeria Khal was levied, and which continues to yield a Revenue of from 3 to 4,000 Rupees per annum.

4. In respect to the project for damming the Gobra Khal, it appears that the information furnished to the Military Board by the late Captain Thomson, in compliance with their Letter of the 25th October 1836, was not of a nature to satisfy the Board of its expediency, and they accordingly withheld their recommendation to the execution of the work.

I have the honor to be,
Sir,
Your most obedient servant,
(*Signed*) W. RUTHERFORD, *Captain*,
Executive Officer Canals

CALCUTTA,
17*th November*, 1845.

No. XXIII. *a.*

***Statement of the Annual Revenue derived from Ferries, Fisheries, and Ground rent, &c. on the Calcutta and Soonderbund Canals, from the year* 1836-37 *to* 30*th April* 1845.**

Year.	Tolly's Nullah Ferry Rent.	Tolly's Nullah Fishery Rent.	Circular Canal Ferry Rent.	Circular Canal Fishery Rent	Baliaghatta Dock Fishery Rent.	Chaltabariah and Bhangor Canal Ground Rent.	Ghonee Maugee Canal Ground Rent.	Fines, &c.	Annual Total.	Remarks.
1836-37, ..	133 0 3	25 0 0	72 12 0	34 2 10	.. .. ..	.. .. ..	.. .. ..	.. .. ..	264 15 1	
1837-38, ..	107 10 0	150 0 0	121 8 0	204 15 10	.. .. ..	.. .. ..	15 12 0	142 6 0	742 3 10	
1838-39, ..	107 10 0	150 0 0	124 0 9	178 14 4	.. .. ..	200 0 0	63 0 0	.. .. ..	823 9 1	
1839-40, ..	113 11 6	202 8 0	127 3 0	206 4 0	.. .. ..	160 0 0	63 0 0	1,387 11 2	2,260 5 8	
1840-41, ..	132 0 0	343 1 1	127 3 0	210 0 0	.. .. ..	160 0 0	63 0 0	920 4 3	1,955 8 4	
1841-42, ..	132 0 0	290 0 0	208 2 3	210 0 0	112 14 8	160 0	63 0 0	1,602 12 1½	2,778 13 ½	
1842-43, ..	176 4 0	298 0 0	474 12 0	250 8 0	271 0 0	269 2 8	94 2 8	824 11 9	2,658 9 1	
1843-44, ..	239 4 0	349 8 0	579 0 0	322 0 0	271 0 0	341 10 8	96 0 0	906 6 1	3,104 12 9	
1844-45, ..	220 8 0	296 4 0	672 0 0	264 12 0	271 0 0	260 2 8	96 0 0	777 0 ½	2,857 10 8½	
Grand Total,	1,361 15 9	2,104 5 1	2,506 9 0	1,881 9 0	925 11 8	1,551 0 0	553 14 8	6,561 3 5	17,446 7 7	

(*Signed*) W. RUTHERFORD,
Collector of Canal Tolls.

Canal Office,
17*th November*, 1845.

No. XXIV.

No. 252.

FROM THE DEPUTY COLLECTOR OF CALCUTTA,

To J. MORRIS, ESQ.

Clerk to the Committee upon Municipal Improvements.

Dated Calcutta the 20th November 1845.

SIR,

With reference to your Letter No. 2076 and 3006, dated respectively the 18th September and 11th instant, I have the honor to forward a Statement exhibiting the Rents derived from the Surplus Lands along the Circular and Balliahghattah Canals and Tolly's Nullah, from 1232 to 1251, B. S.

2nd. The Entally and Soonderbunds Canals not being under the jurisdiction of this Office, I regret I am unable to furnish you with the Statement of Rents derived from the Lands along those Canals.

I have the honor to be,
Sir,
Your most obedient Servant,
(Signed) D. W. FRASER,
Deputy Collector.

No. XXIV *a*.

Statement of Rents derived from the Lands along the Circular and Balliah Ghatta Canals and Tolly's Nullah, from the year 1232 *to* 1251. *B. S.* [*i. e. from A. D.* 1826 *to* 1845.]

Names of Canals.	For 1232.	For 1233.	For 1234.	For 1235.	For 1236	For 1237	For 1238	For 1239.	For 1240.	For 1241.
Circular Canal, ...	....	....	....	....	....	....	419 8 6	805 11 10	942 6 2	1,114 0 0
Balliah Ghatta Canal,	2,586 4 9	2,544 9 7	2,556 2 1	2,565 0 10	2,532 14 1	2,575 14 1	2,352 4 3	2 332 0 10	2,097 3 9	2,179 14 6
Tolly's Nullah, ...	10 6 4	11 8 6	11 8 6	8 10 9	11 8 6	11 8 6	8 14 11.	11 8 6	8 14 11	38 5 0
Total, ...	2 596 11 1	2,556 2 1	2,567 10 7	2 573 11 7	2,544 6 7	2,587 6 7	2,780 11 8	3,149 5 2	3,038 8 10	3,332 3 6

Names of Canals.	For 1242.	For 1243.	For 1244.	For 1245.	For 1246.	For 1247.	For 1248.	For 1249.	For 1250	For 1251.
Circular Canal, ...	1,274 2 0	1,388 5 8	....	1,762 8 0	2,350 0 0	2,350 0 0	2,350 0 0	2,350 0 0	1,834 5 0	8,342 0 11
Balliah Ghatta Canal,	1,961 11 6	2,054 13 4	2 073 8 0	2,260 11 11	2,014 5 6	1,761 10 9	2,276 6 0	2,380 0 0	2,325 9 11	2,495 4 10
Tolly's Nullah, ...	13 0 0	49 3 1	165 5 0	90 8 0	132 8 0	107 0 0	119 0 0	123 0 0	126 15 8	116 6 0
Total, .. .	3,248 13 6	3,492 6 1	2,238 13 0	4,113 11 11	4,496 13 6	4,218 10 9	4,745 6 0	4,853 0 0	4,286 14 7	10,953 11 9

	Total, Co's. Rs.	Remarks.
Circular Canal, ..	27,283 0 1	
Balliah Ghatta Canal.	45,916 6 6	
Tolly's Nullah.	1,175 12 2	
	74,375 2 9	

Calcutta,
Deputy Collectorate,
The 20th November 1845.

E. E.
D. W. FRASER,
Deputy Collector.

Exd

N. C. MITTRE.

No. XXV.

Queries to which Answers are requested by the Municipal Committee relative to the lines of Navigation between the Hoogly and the Ganges through the Soondurbuns, and to a Canal to Channel Creek.

1. What advantages have resulted from the formation of the Canals projected by Major Schalch from the Chitpore Bridge, and thence through the Salt Water Lake to Bamenghatta and Hoseinabad, on the Juboona River? Is the passage through these Canals generally used and preferred, to the former route through the Soondurbuns; and with what advantage in point of time, and safety, and convenience in the Navigation from Hoseinabad to Calcutta?

2. What local advantages would be obtained from continuing the above Canals as proposed by Major Schalch, and shown in Captain Prinsep's and Lieut. Hodges' Maps of the Soondurbuns from Hoseinabad to Koolna? What would be the shortening of time, and the additional safety and convenience thereby obtained in the Navigation from Koolna to Hoseinabad?

3. What is the probable number of Boats, and of what Tonnage, that now come down the Ganges, and so to Koolna, on their way to Calcutta, during the months of January, February, March, April, and May, when the communication between the Hoogly above Calcutta and the Ganges is obstructed?

4. What is the time now taken on the average by loaded Boats, during the above dry months, between Rajmahal and Calcutta by way of Koolna; and of this how much is actually taken between Rajmahal and Koolna, and how much between Koolna and Calcutta by the Soondurbuns?

5. Do Boats now frequently, or ever, take the route from Koolna to Hoseinabad, thence to take advantage of the Canal through the Salt Water Lake to Calcutta?

6. Do the dangers of the passage between Koolna and Calcutta through the Soondurbuns from Tigers; from the crossing the large Rivers; from the necessity of Anchoring with such frail Boats, and imperfect tackle as are used in this Navigation, and the delays in waiting for changes of Weather and Tides thereby occasioned, remain now the same as in 1822, when the Answers now submitted to you for your perusal were returned to a Committee then appointed to inquire into these matters? Or, in what degree, and by what causes, are these dangers and delays diminished? Do they now influence the rate of freight; and if so in what degree?

7. Supposing a Canal, such as that from Hoseinabad to the Salt Water Lake, completed from Hoseinabad to Koolna, what probable amount of Tonnage or number of Boats would take that route to Calcutta, in preference to the present; and with what saving of freight—and what part of that saving might be levied by the Government as Toll on such new Canal without inducing a preference of the old route, or overburdening this branch of the Navigation?

8. What is the amount of Trade between Calcutta and Assam, Sylhet, Dacca and Chittagong, and places adjacent, which is now carried on through the Soondurbuns to Calcutta; and which of the Soondurbun routes, as shewn in Lieutenant Hodges or Captain Prinsep's Map of the Soondurbuns, is generally used by Boats coming from those places on arriving at Magpussa and Sujagunge, on the Domuda River, at its junction with the Charcolly River, and again on arriving at Koolna; and do the Boats from the above places mostly discharge their cargoes at Balliaghatta or Tolley's Nulla, and what is their general burden?

9. Is the portion of the Commerce of the country that may now be conveyed in large Boats, likely to adapt itself to the Navigation of the new Canals in respect to using Boats of light draft?

10. Provided that a navigable Canal of 130 miles long, existed from Rajmahal, on the Ganges, to Mirzapore Creek on the Hoogly, which it is calculated would shorten the distance about 15 or 20 days to Boats coming from the Upper Provinces proceeding through it, instead of by the Soondurbun passages to Calcutta; and a Toll of 2 Rupees per 100 maunds of a boat's burden were levied on Boats passing through such Canal, or four times the amount of that levied by the Soondurbun route, and the passages by the Bhageruttee, Jellinghee, and Mattabanga were closed; are you of opinion that the Commerce of the Upper Provinces would still continue to come by the Soondurbun route in preference to the more expensive, though possibly more convenient passage by the Rajmahal Canal?

11. Are all the present Soondurbun passages kept clear of sunken wrecks and boats, and the Towing paths free from jungle and in good order; and are there any stumps of Trees and Sand-banks which obstruct the Navigation? If so, please to state in what localities these things exist. Have you any observations to make in regard to the dangers and inconveniences of the Soondurbun Navigation, and the means of improving it?

12. Do any and what description of Boats make use of the route taken by the Steam Vessels passing to and from the Hoogly at Channel Creek through the Soondurbuns, and thence into the Ganges?

13. Could Ships with any convenience or advantage proceed from Sea up Channel Creek, there to discharge their cargoes for transmission to Calcutta by Boats?

14. In the present state of the Trade, and of the Shipping resorting to the River Hoogly, and taking into consideration the use of Steam-Tugs, do you think any, and what advantage would be derived from enabling Ships to discharge their cargoes at the new Anchorage, or Diamond Harbour, for transmission from thence to Calcutta in Boats by a Canal, such as was proposed by Major Schalch independent of the Hoogly above that point?

15. If a Canal from Tolley's Nullah to Channel Creek, as proposed by Major Schalch, were carried into execution, would Commodities from Dacca, Sylhet, Assam and Chittagong, and places adjacent, and from which of them, come by it to Tolley's Nullah; and with what, if any, advantages over the present route?

No. XXVI.

Answer of ALLAN, DEFFELL, *& Co. to the Queries printed at page* 115, *of this Appendix, marked No. XXV.*

No. 2087.

J. MORRIS, ESQ.

Clerk to the Committee upon Municipal Improvements

SIR, *Calcutta, 6th December*, 1845

Your letter of 6th ultimo, on the subject of Canal Navigation through the Soonderbuns, has received our best attention, but we prefer incorporating any thing we may have to communicate, through the medium of the Chamber of Commerce, to whom we find you have addressed yourself on the same subject.

We return the Book of Reports and Maps.

We take this opportunity to express a hope, that the state of the Native Town of Calcutta, will come within the scope of your Committee's labours; and that the Strand Road will be carried round to the Canal at Cossipore; the Canal from the Salt Water Lake brought round *South* of Calcutta, and several deep drains cut from the Canal into the Hooghly through the Native Town, and one or two wide streets opened at right angles from the River. The state of the Native Town demands the immediate attention of the local Government.

We remain,
Sir,
Your most obedient Servants,
ALLAN, DEFFELL & CO.

No. XXVII.

Answer of J. H. HOLMES, ESQ. *Secretary S. U. I. Co. to the Queries printed at page* 115, *of this Appendix, marked No. XXV.*

To J. MORRIS, ESQ.

Clerk to the Committee upon Municipal Improvements, &c.

SIR, *Calcutta*, 10*th December*, 1845.

I had the honor to receive your Letter No. 2094 of 6th November 1845, requiring of me to report the present state of the Canal Navigation through the Salt Water Lakes and the upper Soondurbunds, and any suggestion I can offer in the removing of inconveniences to Boats insured at my Office passing that route.

I regret much to say, in reply, that I have not had any opportunities of moving out of Calcutta, so as to speak positively on the Queries set forth, but generally to remark, from reports frequently made by the Churranders and Manjees of such Insurance Boats, of the great inconvenience from obstruction they meet with in the passages by the Soondurbund route, of the narrow and shallow state of the passages, that I have been frequently obliged to send people to assist in lightening Boats to cross the shallows, and the only suggestion I can offer, would be to remove the difficulties in the Navigation, by *widening* and *deepening* the bed of the Rivers, in those parts, so as to admit of Boats of any size to navigate without obstruction during the *dry months*.

The Boats generally are of the burthen of 1,000 to 1,200 maunds, which come down from the interior, and from their bulk and draft of water it is impossible for them to pass without dangers.

I am sorry that my being stationary in Calcutta, and from the nature of my business, I have not had time to enquire into matters, so as to remark with any satisfaction to the proposed Queries.

The printed Book, &c. that accompanied your letter, as requested, is herewith returned.

I have the honor to be,

Sir,

Your most obedient Servant,

J. HOLMES, *S. U. I. Co.*

No. XXVIII.

Answers of D. McPherson, Esq. Soondurbun Grantee, to the Queries printed at page 115, *of this Appendix, marked No. XXV.*

To J. MORRIS, ESQ.

Clerk to the Committee upon Municipal Improvements, Calcutta.

Sir,

I have the honor to acknowledge the receipt of your Letter No. 3,001, dated the 5th November last, and in reply beg to submit a few remarks regarding the Eastern Canal, and for the Committee's consideration.

I have to apologise for having delayed so long to reply to your Letter, but my absence from Town, together with having much business to attend to at this season of the year, has been the cause of the delay.

Should the Committee desire any further information regarding the Huseinabad Canal, I shall be happy to furnish any information in my power, verbally, by attending at the Town Hall for that purpose.

I have the honor to be,

Sir.

Your most obedient Servant,

D. McPHERSON.

Calcutta,
8th January, 1846.

No. XXVIII. *a.*

The Eastern Canal from Balliagatta to Huseinabad is much frequented by Boats not drawing more than 4 or 5 feet, but Boats of a larger description are obliged to take the Southern route by the Roymungul and Attarabanka rivers, a great number of the large Boats pass through the Canal when returning empty.

The distance by the Eastern Canal is much shorter and safer than by the other line, but as the Canal has not been deepened since it was first made, except for a short distance, about 14 years ago in the Cut between Bamangatta and Cantatulah, it has become very shallow at Bhaugor, Choital, Bowaneepore and Soolkooniah, at which places Boats drawing 4 feet, can only pass through at high water.

The Canal at the places alluded, more particularly about Bhaugor, become dry, even long before low water Tide, consequently causing great detention.

To make the Canal really useful, it would be necessary to deepen all the Cuts from Bamangatta to Huseinabad. The natural Creeks and Rivers on the line are deep enough for any sized Boats—but should the proposed Canal from Huseinabad to Koolna be carried into effect, then, to avoid the Southern route, the present Canal should be made deep enough to allow Boats of the largest draught to pass through, otherwise, Boats, on arrival at Huseinabad, would have to run down the Jaboonah River—Bissuntpore and the Kalindee River, and so on by the present Southerly route to Calcutta.

The Towing paths require to be kept clear of jungle, and bunds made on low lands under the influence of the Tides, also a few Bridges* made over small Nullahs that occasionally intervene.

* i. e. Rustic, or wooden Bridges J. M.

To keep the Canal however in good order, and to see that the Towing paths are kept in repair and free of jungle, European superintendence is absolutely necessary ; at present a few hired Coolies are sent under the charge of a Sirdar, who cut a few bushes here and there, but the work is done in such a slovenly manner that no permanent good is effected by such an outlay. The Cut from Cantatullah to Chiltaberiah, on the north bank, is overrun with Date and Babool trees to the water's edge, so that no Boat can track along that line, and the same is the case in many other places on the route.

I made an offer to the late Captain Thomson to keep the banks of the Kooltee Khall clear of jungle, as far as my own land extended, and to allow the use of my own bund for people towing Boats along the River, provided the actual expence of clearing the jungle only should be paid ; but the amount placed at Captain Thomson's disposal, was so small, that he could not allow more than one-fourth of the sum that the labour would incur.

The whole sum allowed to Captain Thomson for clearing the Towing paths, &c. from Bamangatta to Huseinabad was only 700 Rs. yearly.

There are not many sunken trees or stumps in the Eastern Canal, but I have known of several accidents to Boats from this cause, as the banks fall in occasionally, and perhaps bring down a large tree, which is not in all probability ever removed. One or two Tanks along the line would be of great use to the people passing through ; fresh water is scarce in the Sunderbuns, and travellers depend entirely on the good will of a few of the Grantees and others who have made Tanks at their own expence ; a good many labourers are to be had from the beginning of January to the end of May, but principally from the old cultivated country bordering on the Sunderbuns.

To fill up all the large Khalls that enter the different Cuts of the Canal would be impossible ; but all small Creeks may easily be blocked up. No drainage should be allowed to the Canal, unless by Sluice Gates, otherwise considerable injury is caused by openings in the soft soil, where the rush of water carries a large portion of earth into the Canal, which of course helps to fill it up ; this is particularly the case between Cantatullah and Bhaugor, where these openings have in several places grown into considerable sized Nullahs, which compel Boatmen either to wade through, or otherwise to get on board of the Boat, in order to be able to cross these annoying stoppages.

I am not aware of any improvement that can be made on the Southern route through the Sunderbuns, further than making one or two Tanks in convenient places. The want of fresh water is seriously felt, and I know of an instance in which an affray occurred between some of the Governor General's servants and the Grantees' Ryots on account of fresh water, which led to a prosecution before Mr. Mytton, then Magistrate at Baraset. Many Boats are annually wrecked, and men taken away by Tigers on this route—but I have only heard of one instance of a man having been taken away by a Tiger on the Huseinabad Canal.

With respect to that part of the Canal between the Lake and Intally, I beg to offer a few remarks.

The Circular Canal has no doubt greatly improved the old Canal from Termoony to the Toll house. When the Locks at Chitpoor are opened, the rush of water from the Hooghly is very strong, by which means the Canal has been kept clear of deposit, and also greatly widened during the last few years; large pieces of the Cutcha road on the South side has been undermined and carried away, and it is to be hoped that a few more years will suffice to sweep that road away altogether; but the great strength of the current when the Locks are opened (on account of the yet narrowness of the Channel) has been the cause of much injury to deeply laden Boats, large numbers of which are constantly to be seen sunk in the Canal; this evil would however be removed if the Canal was wide enough to admit of two of the largest sized Boats to pass out and in freely, without coming in contact with each other, which is not the case at present. The Superintendent some years ago had piles driven in to support the banks, but I am happy to see that they have nearly all disappeared; the sooner the banks give way the better for public convenience.

I would also suggest that a substantial bund should be made from the English Salt works along the Lake Canal, with Bridges on the Nullahs to Bamangatta. A small bund has been made along a part of the distance, but it has generally been overflowed during the rains, and consequently impassable. A bund of 30 feet base, and 6 feet high, is required in such low land.

I also beg to submit a few remarks regarding the Establishment employed in managing the Toll on the Canal. I have been in the habit of passing out and in almost every month during the last 15 years, and while I freely acknowledge that the Canal has been much better managed since it has been placed under the charge of a Military Officer, still I am of opinion that one or two active European inspectors is much required, to be constantly on the spot, for the purpose of controlling and checking the Native Subordinates, so as to prevent all abuse and extortion, which is, at present, to my certain knowledge, universal amongst them, for not a Boat can pass out, and in, even although it may be under the size that are required to pay any Toll whatever, without paying certain sums which the Canal Officers call Dustoor, not a pice of which sums finds its way into the Public Treasury.

With reference to a Canal from Huseinabad to Koolna, I am not sufficiently acquainted with that part of the country to offer an opinion, but judging from the appearance of the country on the map, I think it would be of great benefit,—particularly if it were made deep enough to admit Boats drawing 7 or 8 feet—it would certainly improve that part of the country very much, and drain the large waste called the Boirah Jheel, as well as affording a safer and shorter passage from the upper provinces.

I am of opinion that a Canal from Tolly's Nullah to Channel Creek would be of great benefit, and easily executed. The traffic from the country South of Calcutta, is very large, particularly in the article of Rice, immense quantities of which is brought to Town for shipment to Europe; besides a large quantity of salt from Tumlook, Hidgelee, and Diamond Harbour would pass through that line; at present all the Salt and other produce can only go during the North-East Monsoon by Channel Creek and the Dooagrah River, through the Soonderbuns, a dangerous and circuitous route, which occupies 7 or 8 days in passing through an entire waste where Tigers abound, and not a drop of fresh water obtainable. The distance from which firewood is brought into Calcutta at present is upwards of one hundred miles—indeed, a large portion of that necessary article is brought from Bakergunge, while, should a Canal be opened to Channel Creek, an immense quantity of fuel would be available within a short distance of the capital. The Canal from Tolly's Nullah to Channel Creek would have no cross currents the whole way, and with a Lock on the Diamond Harbour Creek, and perhaps one at Culpee for the entrance of Boats from the

Hooghly, there would only be the Tide from Tolly's Nullah and the other from Channel Creek, which would prevent the frequent deposit that occurs in the Eastern Canal, a few Sluice Gates to drain the country would be required. Such a Canal would, in my humble opinion, soon repay the outlay to Government. I saw a few days ago when at Saugor, a large fleet of Boats loaded with salt, passing through Channel Creek from Hidgelee en route to the eastern provinces, which they can only do at this season of the year—whereas a Canal on the line alluded to, would afford a safe and quick passage at all seasons.

7½ CHOWRINGHIE,
8th January, 1846.

D. McPHERSON,
Soonderbun Grantee

No. XXIX.

Answer of J. CAREY, ESQ. to the Queries printed at page 115 of this Appendix, marked No. XXV.

To J. MORRIS, ESQ.
Clerk to the Committee upon Municipal Improvements.

SIR,

I beg to acknowledge the receipt of your Letter, No. 3021, dated 11th December last, and in answer to state, that I should have replied without delay to the same, had not severe ill health then prevented me. Being somewhat recovered now, I take the liberty to do so to the best of my knowledge and ability. The documents that accompanied your letter I returned to your Office at the time, and now return the only one I then retained. With the exception of my regular trips weekly through the Ballyaghat Canal to Narainpore, I am sorry I can give no information regarding any other part, not having had occasion to visit them. It is now about 9 years since I was appointed to Narainpore, and I am happy to state, that the passage from Ballyaghat to Narainpore has been very much improved during that period. There are still near Ballyaghat, sunken Boats and Fishermen's Stakes in parts of the Canal, which ought to be removed, but nothing equal to what there used to be in former times—and in my opinion, if the Canal could be kept free from these, made wide enough at Ballyaghat to receive the number of Boats that come in at certain times of the year, when it is so full that the passage is nearly choked, and embankments or bunds made on both sides, with the jungle cut away for tracking boats, the passage up to, and through, the Ballyaghat Canal might be made as safe and desirable as possible.

I have the honor to be,
Sir,
Your most obedient humble servant,
J. CAREY,
Superintendent Narainpore Salt Works

CALCUTTA,
9th January, 1846.

No. XXX.

Answer of ALFRED HARRIS, *Esq. to the Queries printed at page* 115 *of this Appendix, marked No. XXV.*

J. MORRIS, ESQ.

Clerk to the Municipal Committee.

SIR,

I beg to acknowledge your communication of the 11th ultimo. My absence from Calcutta has delayed my answering it earlier, and at the same time I am sorry that I am unable to give more information.

Q. 1. The advantages of the Chitpore Canal has been great, which is clearly shewn by the immense traffic that daily passes through it, as well as that of the Salt Water Lake. Both these Canals are subject to much improvement. 1st, By better attention being paid to keeping the Channels clear of wrecks and other obstacles that are daily occurring. I have known sunken Boats to remain for days together without the least effort being made to clear the obstruction; Fishing Boats, mooring their nets in the passage of the Lakes, much impeding the passage through that Channel, which ought not to be permitted; the Chur that has formed at the Balliaghatta end of the Lake Canal ought once every year to be cleared away, as the Boats cannot get out of the Canal after the tide has ebbed; the careless manner in which all the Boats are laid, in all parts of the Canals, both loaded and unloaded, stopping up both inward and outward transits; this occurs from the insufficiency of the Native superintendence, whereas if one or two European overlookers were placed on these very thronged Canals, would tend much to facilitate the Navigation, and be the means of protecting the inward produce that passes through.

The Canal from the Canal Toll Gate to Bamenghatta requires a Tow Path, one has been attempted, but of so small a description as to be of very little service on spring tides; also a number of the smaller Nullahs have no* Bridges for people to pass, except by swimming.

* *i. e.* Rustic or Wooden Bridges. —J. M.

The part of the Canals that run from Bamenghatta to Chultabarriah is in the dry season almost impassable for Boats above 500 maunds, except on spring tides, when Boats of 1,000 maunds may be got through with difficulty. The length from Chultabarriah past Banghahaut to Kamergatchy, is in so bad a state that small fishing Boats cannot pass till half tide, and all the Towing Paths are out of repair, and in some places impassable from breakages and bush.

The Canal from Bussora to Hosienabad I am unable to speak from want of experience, as I have never travelled through that part of the country.

The passages by these Canals cannot be used by Boats above 800 maunds, except in very high tides, and even then not more than three in ten pass that way, but more generally by the Attra Banka route. There are many circumstances that deter Native Boats taking the Canal routes, one of which, and the principal, is the exaction that they are liable to by the different Chokeys and Thanas on the passage, which daily can be observed in the Balliaghatta Canal; therefore if it takes place so near the city, what must it be in more distant parts, where detection is so difficult—the poor people rather than be detained will pay any demand so as to pass on. I merely advert to this, as one of the reasons that tends to prevent these Navigations being used; these exactions being added to any Toll the Government may wish to impose, will almost prevent Boats taking these passages.

The traffic by the Soonderbuns via the Attra Banka passage from Culna, Chittagong, Burmah, Shylet, Dacca, and all the Eastern Provinces is immense in the Dry Season, it is one continual transit of Boats, of sizes varying from 100 to 6000 maunds, carrying all descriptions of produce. I should say 30 to 40 Boats are the average daily from October to April. The greatest difficulty felt on this passage is the want of fresh water, there being none procurable between Shereghatta and Attra Banka, of which place I am the owner. In the Dry Season I am obligated to forbid the Public the use of the water in my tanks, much against my will, for if I gave promiscuous permission to all Boats, my own Tenants would be left without any supply. This circumstance leads to many quarrels and disturbances; last year I laid out 500 Rupees in making a Tank, but find that is quite insufficient for the public supply. In the year 1833, I addressed the Joint-Magistrate of the district upon the matter of being allowed some assistance from the Government to enable me to excavate a Tank sufficiently capacious to supply the Public, offering a space of land for that purpose; but I obtained no reply. I am still so inclined should the Government feel disposed to assist the Public in procuring a supply of so needful an article; I would undertake to have one or two Tanks excavated on my property for the use of the Public for about 1,000 Rupees. The time saved by traversing the two routes, I am unable to give any opinion.

Q. 2. I am unable to give any opinion.

Q. 3. Ditto.

Q. 4. Ditto.

Q. 5. Ditto

Q. 6. I should think the same dangers exist as in 1822, excepting that there is a resting place in the jungle passage, which was not in existence in that year, where boats are free from tigers, and can remain with safety in bad weather, or till tides suit for them to proceed. I cannot say if the dangers influence freight, but should suppose so in a partial degree.

Q. 7. Native boats, "where time is not an object," would I think in the fine season, rather prefer the Soonderbun passage than through the Canals, from the circumstances I have already alluded to.

Q. 8. I cannot give any opinion upon the amount of trade from the places mentioned, but I know it is of very great extent, if I may judge from the number of boats passing through the Attra Banka, the greater part of which boats discharge their cargoes at the Balliaghatta, or pass through that Canal into the river Hoogly. I should say eight out of every ten boats, pass the Balliaghatta in preference to Tolly's Nullah, as part of the latter passage is obstructed by shoal water.

Q. 9. Unable to give any opinion.

Q. 10. Ditto.

Q. 11. I mentioned before, [that] the Canals, in many places from Balliaghatta to Kamergatchy, are often obstructed for days together by sunken boats, and all the tow-paths are in want of repair—bridges over Nullahs, and jungle on the banks, all obstruct the navigation, which with very little cost, and better superintendence, would be done away with. The Balliaghatta is generally the most obstructed; this occurs by the inattention to the laying of the boats loading and unloading, and the dilatory exertions that are made to clear away any sunken boats. I have seen them laying for days after the accident may have taken place, much to the detriment of the navigation. I have never seen any very great danger in the Soonderbun route, although it must exist, with such frail boats as sometimes take the passage; but from September to April very little, and when any loss does occur, it generally is from negligence or the incapacity of the people in the boats, and their overloaded state. Water is the principal detriment on this passage.

Q. 12. I have been in the habit of traversing up and down the River Hoogly all the year round for upwards of twenty years, and I have barely ever seen any Boats pass in or

out of Channel Creek, excepting those belonging to the people on Saugor Island. A few Salt Merchants' Boats from Diamond Harbour may occasionally do so, but I do not think any others.

Q. 13. In my opinion Ships in the S. W. Monsoon would not be able to use Channel Creek as a place of safety to discharge their Cargoes. In the 1st place in some parts it is barely navigable; 2nd, there is no water or provisions procurable; and in the 3rd, no Ship would lay there to discharge, when, for half the expence and risk [they] could, by taking steam, go up to Calcutta, where every convenience is to be procured, to refit, repair, reprovision, unloading and reloading, which in my opinion would be done cheaper and with greater expedition; and first of all to be considered, is the health of the Crews, who would invariably suffer in such an unhealthy spot. Where the Canal is proposed to terminate in Channel Creek there is no place in its vicinity for Ships to anchor. I do not think that Ships would find any advantage in discharging their Cargoes in Channel Creek.

Q. 14. In the present state of the trade to Calcutta, I do not think any Ships would discharge their Cargoes at Saugor "there being no New Anchorage;" or do I think at Diamond Harbour, except in casual cases of injury and damage, as Ships can be taken to Calcutta in less time than their Cargoes would take to reach by the Canal. It would be only isolated cases of Ships being too deep to cross the James and Mary's, when that Channel may be in a bad state; even in this case it would be only a few boat-loads that would be discharged to lighten a Ship a foot or two. There are a great many circumstances operating against Ships loading and unloading at Diamond Harbour, the constant want of quick communication between the parties interested in loading and unloading; great risk of damage to Cargoes passing up and down even in a Canal, more so in the rainy months. After all, it could not be done cheaper than if the ship discharged at Calcutta, where every convenience is to be procured for immediate dispatch. No Boats can be used in the S. W. Monsoon to unload Ships at Saugor—therefore Sloops must be used, which would not be able to pass through a Canal. Boats from the Western side of the Bay and River, such as Cuttack, Balasore, Hidgellee, would never cross the River to enter the Canal at Channel Creek or Diamond Harbour. To the first named place the heavy Sea that generally runs between Kedgeree and Mud Point, would deter them from attempting to cross; the Western Shore being generally a weather one, they run up along it to Diamond Harbour; when once arrived there, they are in comparative safety, and would not feel disposed to pay for entering the Canal, money being the main object with natives and time nothing, they will always sacrifice the latter to the former, which ought to be considered with regard to an undertaking paying itself for the outlay.

The Steam hire for taking Ships up and down the Hoogly is greatly on the decrease, and will be still more so in a few months, as more opposition is brought into play; therefore it is reasonable to suppose that Ships would proceed to Calcutta to discharge in preference to remaining below it, to much inconvenience, and the expense of proceeding to Calcutta being so moderate, the city being the head mart of all commodities, and heart of all interests, would tend always to induce Shipping to proceed to it.

If the Government are disposed to facilitate the Navigation of the River Hoogly, a Canal being formed between Fultah and Diamond Harbour sufficiently deep to take a Ship of 18 feet through on a Flood Tide, would in my opinion do more to benefit the navigation up the Hoogly, and the interests of the port of Calcutta, than any Canal that could be formed to Channel Creek or Diamond Harbour. Ships would use it in preference to risking passing over the dangerous Shoals at the James and Mary's and Fultah Sands; the expence would be less, Commerce would be expedited "and time saved." The distance is but small, being only 5 to 6 miles, and two good entrances can be procured for the entrance and discharge of the Ships, one being at Fultah Creek, and the other a little

below Kroekrahatta trees. This passage would be the means of avoiding a number of very dangerous shoals, and sometimes facilitate Ships arriving in Calcutta from one to four days, which would be a great object alone, besides avoiding those dangers already mentioned.

Q. 15. Providing a Canal, formed between Tolly's Nullah to Diamond Harbour or Channel Creek, as proposed by Major Schalch, was carried into execution, I am of opinion that commodities from Dacca, Sylhet, Assam, Chittagong, and other Eastern parts, would not proceed by it, for these reasons—it is the interest of boats to keep as much as possible under the protection of the land, [they] therefore, would not risk crossing the mouths of so many large rivers as would lay in this passage, liable to more stormy weather and heavier sea, than in the more Northern route through the Soonderbuns, via the Attra Banka; again, the want of fresh water would be a very great obstacle—the want of which would be more felt than in the other route; and less capability of being able to supply the wants of the public, there being so much forest land in the journey, and, I should say, greater risks of the people being taken by tigers; in fact, I cannot observe any benefit to the navigation over the present routes, by a Canal from Calcutta to Diamond Harbour or Channel Creek; the only advantage it could possibly be, would be to benefit the line of country immediately in the vicinity of which it passed.

I have the honor to be,
Sir
Your most obedient servant,
ALFRED HARRIS.

CALCUTTA,
13th January, 1846

No. XXXI.

Answer of JAMES MACKENZIE *Esq., Soondurbun Grantee, to the Queries printed at page* 115 *of this Appendix, marked No. XXV.*

To J. MORRIS, ESQ
Clerk to the Committee upon Municipal Improvements, &c. &c. &c.

SIR,

I beg to acknowledge the receipt, this day, of your letter dated the 6th instant, and regret that the Papers, to which it alludes, were not returned when sent to my house in November last, as I was then in England, and only came back to Calcutta by the Steamer Bentinck, last week.

Having been prevented by indisposition, from visiting the Soonderbuns during the last seven years, I can only appeal to my recollections of what occurred on the subject under reference, prior to that period. After the Canals from Chitpore Bridge to Hoseinabad were completed, I frequently passed through them in a small Boleah, endeavouring thereby, to obtain a saving of time; yet, at last, I resumed the old passage through the Attara Banka as preferable. Once I passed through in my Pinnace, but found the new Cut to be less safe, and more inconvenient for a vessel of her size, than the old route.

I have no knowledge of the Soonderbun route beyond Hoseinabad and Bissunpore,—of the number of Boats using it during the dry season,—of the time taken up in their passage,—or of the amount of trade carried on by their means.

When the Canal from Rajmahal to Culna was first projected, I considered that it would have been of great advantage to the internal trade of the country. but when this trade *must* soon be so much influenced by Steamers, and *may* at no distant time, be so

greatly facilitated by railroads, the propriety of *now* making a Canal, subject to the risks noted in Schaleh's Memoir, and liable to be superseded by preferable means of conveyance, may be questionable.

When, also, Schaleh's Canal to Channel Creek was projected, its speedy completion might have secured advantages to the mercantile community, that they would have then considered valuable; but the facility since afforded by Steam Tugs to the navigation of the River, has taken away all occasion for the construction of Canals or railroads below Calcutta, since they could afford no benefits sufficient to counterbalance the waste of human life, that would attend both their original formation and subsequent employment.

I have the pleasure to return, herewith, Appendix (G) with its Appendix, and the separate Map of the proposed Canal to Saugor, and am,

Sir,
Your most obedient servant,
JAMES MACKENZIE.

SULKEA,
11*th February*, 1846.

No. XXXII.

Answer of H. LIMOND ESQ., Secretary to the Bengal Chamber of Commerce, to the Queries printed at page 115 *of this Appendix, marked No. XXV.*

To J. MORRIS, ESQ.
Clerk to the Municipal Committee.

SIR,

Referring to your communications demanding information from the Chamber of Commerce,—in regard to the Canal Navigation through the Salt Water Lake and the Upper Sunderbunds,—and in regard to a proposed Canal to Saugor,—and to the subject of any of the queries in the printed Paper which you furnished—I have to express generally, as the belief of the Chamber, that the works already executed by Government, to maintain a line of communication between the Hoogly and the Ganges through the Upper Sunderbunds, have been of great service to the Trade of the Country; and every improvement of that line must be productive of additional benefit. The Chamber does not possess the means of computing the extent of Commerce which seeks that Channel.

2. The Chamber is not impressed with a high opinion of the advantages which would attend the formation of a Canal from Tulley's [Tolley's] Nullah to Channel Creek. The shipping bearing the maritime trade of this port, would not, it is persuaded, unload or load at Diamond Harbour, but find its way up to Calcutta; for which the increasing provision of Steam Tugs affords facility and security. The construction off Town of suitable wharfs, is the desideratum of most importance, which the Chamber would recommend the Municipal Committee to urge on the favourable consideration of the authorities

3. The Chamber feels assured, that Government could not undertake a work of more utility to the Trade of the interior, than would be achieved by opening a direct communication between the Ganges and Hoogly, navigable throughout the year, such as would prove the projected Canal from Rajmahal to the Mirzapore Creek. This Canal would command the resort of a vast traffic. It might even, on that line and to that extent, be more desirable than a railway.

I have the honor to be,
Sir,
Your most obedient servant,
H. LIMOND, *Secretary.*

CALCUTTA,
BENGAL CHAMBER OF COMMERCE,
April 4*th*, 1846.

No. XXXIII.

Answers of JAMES F. HEDGER ESQ., *to the Queries printed at page* 115 *of this Appendix, marked No. XXV.*

To J. MORRIS, ESQ.

Calcutta.

DEAR SIR,

Mr. Rainy being so much engaged, and so continually absent from home, he has been unable to reply to the questions sent by the Municipal Committee, regarding the Navigation of the Soonderbuns. As far as my knowledge extends, I have given replies, which I hope may be of use.

I am, Dear Sir,

Yours faithfully,

JAMES F. HEDGER.

KHOLNA,

April 13th, 1846.

No. XXXIII. *a.*

Q. 1. Very great advantages have resulted, and the Canals are universally used; being shorter and safer routes to Calcutta.

Q. 2. Cannot say what advantages would be obtained, as boats are entirely dependent on the tides in the Soonderbuns; of course, if a good towing path was made, then a Canal from Hosenabad to Kholna would be highly beneficial.

Q. 3. Impossible to say. Immense in number and tonnage.

Q. 4. Cannot say the time between Rajmahal and Kholna. From Kholna to Calcutta, the largest sized boats, six to seven days, if not delayed in the Chitpore Canal, as is usually the case, to the great detriment of many valuable and easily perishable cargoes: small boats can reach Calcutta, in as short a time as two days and a half.

Q. 5. Always, I believe.

Q. 6. Very little danger from tigers: of course danger to the large unwieldy native boats in the larger rivers during storms. The greatest danger, however, is from Dacoits, and other bad characters. The writer of this, has seen a boat cleared out at *three o'clock in the day;* and has also been a witness to the people of some Zemindar, or Talookdar, taking toll from every boat, that had to pass through a narrow Channel at low water. Many unfortunate people came to the writer for protection. Robberies of one description and another, take place every year, to the extent of many Lacks of rupees, if native reports are to be believed; there appears to be no police in the Soonderbuns. No doubt, if there was proper protection, the trade would be much greater by this route to Calcutta. Boats with valuable cargoes seldom go singly, but in fleets, on account of Dacoits. It is a well known fact, also, that native people in charge of valuable cargoes are watched into and about Calcutta, and then again into the Soonderbuns; and the proceeds of their goods taken from them there. In short, robberies are of hourly occurrence, and will be so, till there is a Magistrate and two or three European Daroghas appointed to the charge of the Soonderbuns; and these officials might much assist in clearing away numerous wrecks and stumps of trees, &c., &c.

Q. 7. Am unable to give a satisfactory answer.

Q. 8. The boats are generally of large Tonnage, but cannot say what,—or give any reply to the other part of the query.

Q. 9. Certainly not, till the boats in present use are done for, as natives are not extravagant in the boat-building line; and many have not the means, although the inclination.

Q. 10. No doubt boats from the Upper Provinces would take advantage of the Canal proposed, were it wide and deep enough for them, and there was a good towing path; the chances are, however, the Canal would soon be filled up with Ganges sand; there is no sand in the Soonderbuns.

Q. 11. All the narrow Rivers are full of wrecks, stumps of trees, &c., as any one can see at low water, and there is very little towing path, and what there is, is much obstructed by jungle. The Chitpore Canal is also famous for wrecks, which lay there for weeks; and the piles driven in at the sides of the banks, are very dangerous, as all the mud is washed away from them, and a boat at high water, when they are not visible, anchoring over them, is liable at low water to have her bottom stoved in. All who have been to and from Calcutta via the Soonderbuns, are unanimous in their opinion of the negligent manner in which the Darogah and others of the Chitpore Canal perform their duties. It sometimes takes eight or ten hours for a small Bauleah to go through the Canal, on account of the many boats of all sizes, allowed to anchor there.

Q. 12. Can give no satisfactory answer.

Q. 13. Cannot say.

Q. 14. Calcutta Merchants can give the most satisfactory answer to this.

Q. 15. Generally speaking, Boats with cargo are consigned to European or Native Merchants' houses in Calcutta, and would of course go to the most convenient and nearest spot to discharge.

J. F. H

No. XXXIV.

Answers of A. Warde Esq., Superintendent of Salt Chowkees in the Soondurbuns, to the Queries printed at page 115 of this Appendix, marked No. XXV.

A. 1. Increased facility of bringing the Produce of the Country through which the Canals pass; greater safety and convenience to the passage of Boats coming from the Upper and Eastern Provinces and districts adjacent to the Canals; and I have not the least hesitation in stating it as my opinion, founded upon observation and experience, in my constant passages through the various Soondurbun Creeks and Rivers, that no Boat that could effect a passage through the Upper Soondurbuns or Canal Route, would ever follow that of the Lower or Attarabanka route, for the following reasons,—

Boats proceeding by the Lower Route are much subject to being wrecked in blowing weather, especially on passing the mouths of the numerous large and deep Rivers which open into the Attarabanka passage or Lower Route, where there is generally a dangerous swell and gusts of wind, which, acting on the round bottom country Boats laden to the very water's-edge, sets them rocking and rolling, by which they take in water and become water-logged, and ultimately sink, and the crew plunged into a deep and rapid river, where alligators of the largest size abound, and if the crew succeed in getting safe to the shore, they are still exposed to be devoured by tigers, as the greater part of the Lower Route is through a very dreary waste or Jungle, with not a habitation near, or even fresh water procurable. The case is widely different in the Upper Soondurbuns or Canal passage, where Boats, not being within the influence of the openings or wide mouths of numerous large rivers, are not subject to sudden gusts or heavy swells; and in case of their being wrecked by any accident, their cargoes are not all lost, as the Boats are not in deep water:—again, there is not such

fear of wild beasts, as the greater part of the route is *now* through *cultivated* land, where fresh water and supplies from bazars are procurable as well as assistance. The time taken up by heavy Boats in both passages, is about the same; but Boats of light draft effect the passage in less time by the upper than by the lower route. I have heard of Bauleahs effecting the passage from Hoseinabad to Calcutta in 17 to 24 hours. I have heard Indigo Planters and others say, who have very large pinnaces *well* found in tackle and stores, and every convenience on board, that they prefer the lower route, as not being exposed to obstructions, and from the inconvenience of stopping at low water between the high wet banks of the Canals.

A. 2.—Increased cultivation; great advantage to the inhabitants residing in the neighbourhood of the proposed Canals, in respect to the convenience of conveying their produce to distant markets; draining and irrigating large tracts of land; greater safety, by the avoiding of large Rivers, especially at those points where several Rivers meet; and I think a shortening of time in the passage would occur, by the avoiding of some very considerable bends of Rivers.

A. 3.—I cannot answer this question. Returns from the Superintendent of Canals, *should* give this information.

A. 4—Ditto.

A. 5.—Much the greater number of Boats pass by the Canal route, thence through the Lake Channel to Balliaghat and Calcutta.

A. 6—The dangers and inconveniences of the Attarabanka passage, remain the same as in 1823, except that there are now one or two patches of Land cultivated.

A. 7.—I do not think any material saving in freight would result; but I think a higher rate of Toll, would not be objected to, if some further useful Canals or Cuts, to be used chiefly as Docks, were made, and *kept,* together with those now existing, in an *efficient* state.

A. 8.—I do not know what is the amount of the Trade, but I should say, that nearly *all* the Trade which arrives at Balliaghatta and Pauspota on Tolley's Nullah, comes from the places cited, and from the countries adjacent to the Canal: but *Returns* from the Superintendent of Canals *ought* to show this, and *also* from *where* Boats come, and their *burthen* and the *description* of their cargoes:—in fact, for useful *Statistical* purposes, every Boat should be required to furnish a Document like a ship's manifest, in Bengalee or English, prepared at, or before its arrival at the Toll House.

A. 9.—Yes,—but, except some Boats from the Upper Provinces, and the larger description of Wood, Lime, and Rice boats, I do not think there are many Boats that use the Soondurbun navigation, which exceed 350 to 600 Mds. burthen.

A. 10.—Provided that the estimated saving of 15 or 20 days of time could be effected, I am of opinion, that all Boats from the Upper Provinces *north* of Rajmahl, and possibly a little *south* of it, would avail themselves of the proposed Rajmahl Canal—but I question if the Soondurbun Navigation was put on a *respectable* footing and viewed as a *National* work of *great importance* to the *increasing* trade from the *Eastward*, whether any *great* saving in time would result, by Boats passing through the Rajmahl Canal, which being obstructed by several Locks, would not be subject to the influence of tides, and consequently a passage through it, would be tedious and laborious, and at the same time would not, I understand, be available in the dry season for Boats drawing more than five or six feet water:—further, this is certain, the Rajmahl Canal would be of no manner of use to the Trade from the *Eastward,*—whilst the Soondurbun Navigation is useful *not only* to the *Eastern* Trade, but *also* to that of the *Upper* Provinces; again no Railway to the Eastward, owing to the country being intersected by numerous rivers, and periodically inundated, is likely ever to be formed—but a railway to Rajmahl, it is possible, can, and

will be made—Rajmahl would possibly then become the great Receiving Depôt of all the chief staples of the *Upper* Provinces, and purchases for Shipment, would be mostly made *there* instead of in Calcutta.

A. 11.—From Baminghatta to Bangur, the Towing paths are good, but the Canal throughout requires deepening ; from thence to Bhowanipoor, dense jungle on both sides, but assistance procurable if required from the various Grants. A very dangerous cut exists from Bhowanipoor to Hoseinabad, which becomes *dry* at half ebb, and so *rapidly*, that if a boat of burthen strikes, she generally *opens* out and becomes a *wreck*, from the hard nature of the soil. I have known 30 to 40 boats waiting at both ends for the tide ; but the greatest danger which exists, lies between the Dappa Toll and the Teenmoony i. e. where the Circular Canal opens into the Balliaghatta Canal—Boats, which have come hundreds of miles, have escaped all the dangers of the road, rejoicing at the termination (as they hope) of their labours, find themselves suddenly deprived of all their hard earnings, by the *disgracefully* crowded and shallow state of the Nullah. In January and February last, I have often counted nine boats *sunk* in the course of a day and night. On the 23d March at night, three large lime boats were wrecked, and many more were landing their cargo on the road from want of water ; and on enquiry of the various merchants, I learnt, that from 1st December to the end of March, *not less than* 150 *boats* of various kinds have been *sunk*, within this short distance, conveying property estimated at 50,000 Rupees This Canal ought to be a passage *only* from the Soondurbuns to the Hooghly, and not an *Import* depôt, for which *separate* Cuts or Docks should be made ; one of the means of forming which, would be by continuing and improving the present Cut on the Western border of the Salt Water Lake, which Cut passes to the North of the Balliaghatta Toll House and Chingreehatta. This Cut should be continued towards the Dum-Dum Road, opposite to, or near, where it turns or bends to the North, going to Dum-Dum, and thence the Canal continued parallel with the Dum-Dum Road, and within a few hundred yards of it to the Circular Canal, joining that Canal between the Dum-Dum, and Nundun Baug Bridges—The above with another straight Cut between the Manicktollah, and the Narcoldangah Bridges, to the proposed Cut at the North Western border of the Salt Water Lake, would very likely answer all the purposes of Docks or Basins, and afford greater facilities of communication with the Salt Water Lake Channel. The above two, direct East and West Cuts, it will be perceived enter the Circular Canal opposite to the Roads leading to the most crowded parts of the Native Town. If to the above, the Balliaghatta and other Roads leading from Calcutta, to the Western border of the Salt Water Lake, were laid with tram-ways, and Storehouses erected in systematic order at the sides of those Roads, it would be very desirable, (See annexed, the plan of the Docks or Cuts which have been drawn on Captain Prinsep's map of the Calcutta Suburbs.) But another and possibly more convenient and compact, and less expensive plan has been suggested to me, and which is also drawn on the above map, and may thus be described.

A to B, represents a Cut or Dock (communicating at *A*, with the Salt Water Lake, and at *B*, with the Circular Canal) of 150 feet in width at top, and 50 feet at bottom, with a depth of about 8 or 10 feet below low-water mark, to be made parallel with the present Balliaghatta Canal, and about 500 feet from its North Bank, and with a Roadway of 25 feet wide on each Bank of the proposed Cut. The oblong excavations running from the South Bank of the above new Cut to the Bank of the Balliaghatta Canal, represent additional Docks or Basins, should they be required, which communicate by Sluices under the Balliaghatta Canal's North side Roadway, with the Balliaghatta Canal, which, assisted occasionally by the Circular Canal, is to act (there being a flood-gate in the new cut at *B*.) as scour's to clear the above Basins or Docks from deposit. The spaces of ground *between* the Docks, together with the ground on their *opposite* or North Bank, should be intersected by Roads not less than 25 feet in width, and about 80 feet apart, and formed North

and South, and East and West from the Balliaghatta Road to the Bank of the Balliaghatta Canal. The sides of the above roads serving as frontages of Golahs or Storehouses, Shops or Huts, to be erected agreeably with a plan to be laid down for their construction so as to prevent crowding, and to admit a free circulation of air. It is submitted that if the above Docks were made, and the Section of the Circular Canal, between the Dum-Dum and Nundun Bagh Bridges, and between the Manicktollah and Narcoldangah Bridges, were widened, and oblong Docks or Basins, with Cranes, Wharfs and Storehouses attached, formed in the vicinity of the above named localities *between* the Circular Road and Circular Canal, *parallel* with the main Roads leading to the suspension Bridges, and within 40 or 50 feet of the above Roads, and the Docks were scoured out by the Circular Canal into the town drains, leading to the River or into a main *central* Tunnel passing through the Town and leading into the Salt Water Lake, as has been proposed, I see, by Colonel Forbes, and Boats were *compelled* to discharge their cargoes in the Docks, a free and unobstructed Channel would always be available for the passage of boats from the Lake to the River, and from the River to the Lake.

A. 12.—Very few except salt and large wood boats, I hear, ever use the route in question; and I have heard from an old branch pilot, that he has seen nine boats of the latter description *lost* in one day, immediately on their *emerging* from the Soondurbuns into the River Hooghly; the Canal to Saugor would obviate such losses.

A. 13.—At certain periods of the year, I think, ships could with advantage discharge their cargoes at Channel Creek or Diamond Harbour.

A. 14.—I do not consider the proposed Canal to Channel Creek as materially desirable to the Shipping, except in affording them several *contingent* advantages during unfavourable periods of the year; but the Canal would be *importantly* useful in bringing to Calcutta the extensive Produce of the country to the South of Calcutta, and afford to all the native Boats proceeding up and down the river, a safe passage at *all* periods of the year.

A. 15.—I think commodities from Chittagong and along that coast, and from Balasore, and places on the West side of the lower parts of the Hoogly would come by the proposed Canal, but not from Dacca, Sylhet, and Assam.

All that appears to be wanting to put the Canal Navigation from the Eastward *i. e.* from the Ishamutty River to Calcutta (beyond which my knowledge does not extend,) in the most efficient state, is to occasionally deepen the present artificial cuts or Canals, and to make to the North of them and of the ridge of the Chalkoonee sand, and out of the influence of the strong tides and deep Channels of the Soondurbuns, a new cut of about 4 or 5 miles long, *i. e.* from near the Northern end of the Chandpore Khal to opposite the Tantwa Khal near Chytal, (See Sketch of the Soondurbun Canals at foot of Captain Prinsep's Map of the Suburbs of Calcutta,) where a flood-gate *possibly* would be required to prevent the tides from the Tantwa and Teoree Khals, from entering the new Cut, where they would possibly be met by an opposing tide in the Cut—the few small Nullahs that might be found leading into the new Cut from the South, should be substantially bunded. To widen the Balliaghatta Canal about 20 feet, and deepen it 3 feet in some parts. To widen the whole length of the Intally Canal, to the same section as its Western end, which would form a very convenient Basin. The above Canals are *much too narrow* for the traffic in them, which will readily be allowed, when I state that I have seen the Canals from the Lake end to the Chitpore Locks, compeletely blocked up with Boats; and it has *often* been a matter of *surprise* to me, *how* the Boats, thus jammed up, *contrived* to make their way *into* and *out* of the Canal—but this I hear they do not effect under 2 to 7 days, and a great number of them become wrecks. To erect on the Canal banks a few public *Wharfs* and *Cranes* at which Boats might unload, on paying a small charge for the accommodation; this would save much wear and tear to the Canal banks, especially if at the same time Boatmen were prevented driving their *luggowing* posts into the

Canal banks—there however would be no occasion for the above recommendation if Boats were *made* to discharge their cargoes in Docks.

To prevent the excavation of earth, for making bricks, and forming tanks, immediately close to the Canal banks, as the water contained in such excavations must tend to undermine the banks. To prevent, by sloping the roads at the sides of the Balliaghatta Canal towards a side Drain, away from the Canal Banks, the rain water which falls on the roads and adjoining lands, from *Guttering* the Canal Banks: a bad instance of this may be seen on one of the banks of Tolley's Nullah, at the late Coal Depôt of Messrs. Carr Tagore and Co. close to Hasting's Bridge. To make a good Road on the South bank of the Entally and Balliaghatta Canal. To make a scour for the Entally Canal, by deepening and widening the side drains of the Dhurumtollah road, which should be permitted to communicate *freely* with the *River* at the *West*, and with the *head* of the Entally Canal at the *East*; this would remove the *horribly unhealthy, and putrid back-water of the Entally Canal*, whilst the scour would tend to deepen the Canal, and save the frequent cost of excavating the Cess-pool and the Canal.

To continue* the present Circular Canal round the Town, to the vicinity of Kallee Ghat, or between that place and the Allypore Bridge, at the same distance from the Circular Road as the present Circular Canal, this would tend materially to drain the swampy ground of Curriah, and Cossiah Baugaun, and Bhowanipore.

To make another direct, *East* to *West* cut from *near* the *centre* of the Lake Channel, and thence to communicate with the proposed continuation of the Circular Canal at that part of it, which would pass a little to the East of La Martiniere School.

1st May, 1846 A. WARDE.

* Note.—At the same time it might be advisable, when the continuation of the Circular Canal to Tolley's Nullah had been executed, to extend the limits of the town to the Canal bank; and to plant a double row of trees on each bank of the Canal, to check or intercept, the pernicious air coming from the Salt Water Lake and its neighbourhood; and to plant a like belt, or row of trees, near the margin of the Lake.

No. XXXV.

Answer of S. G. T. Heatly, Esq. Soondurbun Grantee, to the Queries printed at page 115 of this Appendix, marked No. XXV.

To J. MORRIS, ESQ.
Clerk to the Municipal Committee, &c. &c.

Sir,

I have to apologise for not having long before, at least acknowledged the receipt of your communication dated 6th November last, and I trust that the Municipal Committee will attribute the delay, which has occurred in forwarding answers to the queries addressed to me, not to any want of respect or any indifference on my part, but simply to want of the merest leisure for putting together the required information in that digested shape, in which alone it can be available for the Committee's objects.

2. The queries with which I have been honoured, relate exclusively to the present state of, and suggested improvements in, the various lines of water communication to Calcutta, put with a view to advise such measures to the Government as shall facilitate that communication to the utmost; thereby enlarging the markets for produce and ex-

tending trade. The Lines, regarding which information is more especially desired, are:—1st—That which may be termed the Lower Hooghly system: 2nd—That which may be similarly termed the Upper Hooghly system: and 3rd—The Eastern or Soonderbun system, communicating with the Eastern Provinces from Rungpore, Sylhet, &c., down to Chittagong. And as I understand the papers before me, the requisitions of the Committee divide themselves into:—1st—Full particulars regarding the present state of these several routes: 2nd—Their existing advantages and disadvantages: and 3rd—Opinions and suggestions as to their amelioration.

I. Lower Hooghly Navigable System.

3. The Queries [Nos. (12), (13), (14), and (15),] relating to this system of water-routes, have evidently one prominent object—to determine the feasibility and advantages at the present time of carrying out Major Schalch's proposal to cut a Canal from Channel Creek to Tolly's Nullah. It is also evident that the leading idea, animating these queries, is the benefit to the shipping interest which would accrue from such Canal. Towards that object I frankly confess myself incompetent to afford any elucidation from personal experience. The relative merits of Channel Creek and New Harbour as a shipping station and the terminus of a route across country to Calcutta, have been much discussed since Mr. Hornemann's first Railway project of 1836: and the information then evolved is within reach of the Committee, as well as evidence from Members of the Pilot Service, who must be more familiar with the localities than any other class of persons. This, however, it may be permitted me to say, that from perusal of much of that information and conversation with parties acquainted with the spot, my own impression is distinctly, that neither a Canal nor a Railway communication to Channel Creek, will ever be of use to the shipping interest. The large development of Steam Tugging Companies has already shortened the distance from Calcutta to the sea; has, as a matter of course, diminished the dangers of the passage, and is gradually reducing its expense. We have a daily prospect of the determination of more capital to this branch of what I may term water-carriage: and with the increased competition we shall inevitably have, to judge by the short experience already obtained, more powerful boats and cheaper rates of tugging. Taking this into consideration, and combining with it the natural (perhaps irresistible) tendency for the interests concerned—the owner, the merchant, and the mariner—to be in as close proximity as possible, I do not think that any scheme for transferring the port of the Hooghly from Calcutta to Channel Creek has, as far as can yet be seen, a prospect of success, and for such purpose therefore, I do not think any advantage would follow from carrying out Major Schalch's suggested Canal.

4. In the other light, however, of opening up a new, cheap, and permanent communication to Calcutta, by which local produce may find its way into the market of the Metropolis, it is my decided opinion that the benefits accruing to the district through which it will pass, will fully repay the expense of the excavation, and that the direct Tolls upon the Canal, will be met by those desirous to avail themselves of it to a degree that ought to be considered pecuniarily compensatory by the authorities.

5. It is so difficult to get any precise numerical statistic data from the public records regarding the agricultural produce of any particular district, that I must be excused, if in submitting to the Committee some of the capabilities of the Twenty-four Pergunnahs, I do not appear to do so in the most available form. There are doubtless opportunities by which private individuals may attain to such data, but to take advantage of them where private interest is not combined with scientific curiosity, requires such direct personal labour and consumption of time, as it is scarcely fair to expect from men engaged generally in arduous and engrossing occupations.

6 The chief production of the Twenty-four Pergunnahs is rice, and that almost wholly of the finest qualities; the amount of that production may be estimated when I state, that nearly all the table rice exported, during the late heavy shipments to England and the Continent from Calcutta, (that known as the *Patna*, properly *Putnai*) was the *bonâ fide* produce of this district. The great marts of Mograhat and Rajhat were, during that excitement, scenes of great interest: and agents have repeatedly gone through them, unable to procure rice of the indifferent quality, which it suited shippers to contract for. The grain of the coarser kinds which were secured for the Mauritius market, the Moonghee, is not the growth of this—but of the Backergunge district, the eastern, as this is the western limit of the Soonderbuns. A reference to the shipments made to Europe from August 1845 to March 1846, through the Custom House; to the leading houses of agency making those shipments, and from them to their Banians or other contractors—a not difficult nor tedious series of references—would put the Committee in possession of a clue to the enormous amount which the Twenty-four Pergunnahs spared to the necessity of Europe

7. This rice is derived from the whole surface of the district extending now to the eastward over the cultivated lots in the Soonderbuns, bounded on the southward by the same forest line till its junction with the Hooghly between George's Point and Culpee, and on the West by that river. A dead flat as the district is, it is as may be supposed intersected by a number of water passages, most of them not more respectable than broad ditches, but which are sufficiently broad and deep to admit, when there is any water in them, of the transport of produce on the *salties* and *donghas*, which form the boatage of the district These are of various sizes from the largest class of the former, hollowed out of the "Saul" tree, capable of carrying eighty maunds, down to the little coracle formed of an excavated palm, barely floating with its single guide, who poles it forward with his bamboo *luggee*, keeping a careful look out at the thinner end, which has been stopped up with mud, forming, however carefully plastered, a but precarious excluder of water.

8 The water-courses of which I have spoken, are in communication one with another, so that in the rains, a complete navigable thoroughfare for the boatage which I have described exists in the district, and this lasts till January and February. A glance at the maps of the Twenty-four Pergunnahs, faulty in the extreme as most of them are, will shew how many communications the interior system of water-courses has with the Hooghly on the westward, with the Pealee Nuddee to the east and other Soonderbun streams to the southward. A clear navigation exists from Tolly's Nullah to Culpee in one direction, and to Soorjeepore and thence to the Gordah Salt Works on the other; as well as from Soorjeepore to Culpee itself. We have thus the element of a perfect and permanent intercommunication through the heart of the district: an element, however, at present only available at a particular season.

9. During this season, the produce of the district is transported to the central marts in the craft I have described: at others on bullocks or, where roads permit, on carts. Sold there to the Calcutta Mahajuns or intermediate men, the produce is conveyed generally by the *seller*, now become *carrier*, to the neighbourhood of Calcutta. As regards the rice, this was very extensively done last season: boat loads purchased at Mogra and Soorjeepore being made deliverable at Chitla Hat, on a small payment per boat for the carriage. Arrived at these suburban storehouses, the produce was sent into Calcutta by cart to the godowns of the contractor.

10. So extensive is the determination of produce of one kind and another towards Calcutta through this Southerly district, that in the commencement of April, a friend on whose accuracy I can rely, struck by the influx towards Calcutta, took a census one day of the carts passing his tent, then pitched at Corybarreah on the Diamond Harbour road, and

found them during one twenty-four hours, to amount to 413 ! I do not cite this to the Committee as an average, but at the same time, I think from my own knowledge of the district it ought not to be considered an extreme ; but may be taken, with due caution, as an element of calculation.

11. Much of what I have hitherto said, has been with direct reference to the present staple of the Twenty-four Pergunnahs—rice. But indigo has been extensively tried in it at Sunkarypooker, Bykantpore, Soorjeepore. Bakra, &c.,—Silk at Bakra, Sugar at Barripore : and in no instance (I speak advisedly) have these experiments not met with full success from defects of soil. Relatives of mine have been connected with the district, one way or another since 1790, and their opinions I speak as well as my own. A Canal of about five miles long was commenced upon by my father in 1830 in the channel of an old one, twenty miles long, cut by Mr. Herbert Harris, from Allumpore just below the Semaphore Station at Moyapore, and extending to Jageerghat ; and had not difficulties of a legal nature respecting the property of the ground intervened, the factory of Bakra, now known solely as a rendezvous for the Tent-club, would have become as valuable an indigo as it once was a silk factory.

12. My object in entering into all these details has been to lay before the Municipal Committee the importance of the Twenty-four Pergunnahs as a productive district. If I have not been able to adduce the most efficient data for the purpose, I have perhaps said enough to indicate to the Committee the sources from which more accurate statistics may be obtained. And my further object has been, thereby, to induce the Committee to reflect, whether, if by a modification of, or collateral additions to Major Schalch's Plan, a permanent water communication cannot be kept up through the district, developing its resources, such as they are, and through its better cultivation leading to the more effectual concentration of the social forces upon what, I believe I am not wrong in thinking, one of the original ends of the Committee's labours, the advancement both of the wealth and the sanatory condition of Calcutta by the clearance of the Soonderbun forest.

13. The measure which I am led to think would be most effectual for this purpose, would be a central Canal, such as that proposed by Major Schalch extending from Tollys' Nullah—not however to Channel Creek—but to Culpee. This Canal with locks would be the primary artery of communication : and with it might be combined the opening up of a permanently navigable route to Mograhat, and thence to Soorjepore, by several short cuts, some of them about half a mile, others a few hundred yards, quite sufficient to admit of the passage of such boatage as is now in use, at all seasons of the year. Fed as the central Canal will be by tidal influence, its secondaries will be similarly acted upon, and thus the peasantry of the district will have open to them, the most convenient and cheapest roads for the transport of their produce which the nature of the locality admits of

14. It is with the utmost deference, that I lay these opinions before the Municipal Committee, for I feel that I am pressing them towards a point which may not quite consort with the theories in vogue. The present principle of opening out inter-communications, is too much, I fear, pursued with regard to the interests and views of the capitalist, trader, and distributor, than the interests of the labourer-producers The one it is true cannot be advanced without advancing the other : but those who have watched the history of the last few years, must feel that the disproportion of the two progresses is extreme, and that from that very disproportion arise new relations acting detrimentally upon the weaker producers. Struck by the magnificent result, the accumulated wealth, we consult both in our lines of intercommunication and our methods of carriage, more the immediate interests of Capital than of Labour. This is beginning to be felt in Europe ; in India may we not profit by that experience ? May we not at least while paying full attention to the claims of capital, pay also more attention than has yet been done to the claims of labour ? While

perfecting by railroad the communication between the centres of Commerce, may we not also seek to benefit the masses by increasing the facilities of village intercourse, through opening out such permanent roadways, either solid or liquid, as are cheapest and best adapted to the locality. By spreading over the face of every district such reticulations of thoroughfare, we do an immediate benefit to the peasantry, and we confer, if not an immediate, yet a permanent benefit on the capitalist, by ensuring to his great marts a regular supply, as well as an extensive, of their feed.

15. With this statement, I quit this portion of the subject. If the Committee are desirous of following it up, I shall be happy to enter into it in fuller detail, and even to obtain the requisite statistical data, which I feel assured will convince the Committee that the good effected, and even the pecuniary return obtained, would warrant a recommendation to the Government to undertake such a central cut from Tolly's Nullah to Culpee; accompanied by deepening and extending channels in existence, so as to produce a system of water communication extending through the Twenty-four Pergunnahs available at all seasons of the year.

II. Upper Hooghly navigable system.

16. On this line I have nothing to say, beyond that the development of the Railway system, which in this direction is inevitable, renders the execution of the Rajmahl Canal referred to in query (10) perfectly futile as a superseder of the Soonderbun route for the commerce of the Upper Provinces.

III System of Eastern Canals.

17. This system, as it at present exists, is composed of Tolly's Nullah, the Circular Canal, the Balliaghat Canal, the Lake Canal, the Bhamunghatta Canal, the Doodbeebee Canal, the Chultabarreah Canal, the Bhangor, the Choitol, the Bhowanneepore, the Choolkônee, and the Hoseinabad Canals.

18. With regard to the present navigable state of these Canals, the shallowness of Tolly's Nullah renders it little frequented in comparison to the Balliaghat route, even by boats coming up from the Attarabanka line of navigation and taking their choice of passages at Tarda. Still so large is the influx to Calcutta from the Eastward, that the passage of boats through and their congregation in Tolly's Nullah is, even at this day, an obstacle to rapid transit. The exact tonnage flowing through any Canal I am unable to give, but it may, I think, be gleaned from the amount of tolls collected respectively at Balliaghat and the entrances to Tolly's Nullah.

The complaint of stoppage by the congregation of boats, justified by the state of Tolly's Nullah, is still more justified as regards the Balliaghat and the Circular Canal, especially near their junction with the Entally Canal, at the Tremonee, as it is termed.

This conversion of what was intended as a passage into a harbour, is a primary evil that is not quite met by the regulation permitting a boat to remain tax free between the toll gates for not more than 14 *days. The large 800 and 1200 maund boats with chunam from Sylhet, rice from Burrisaul, and wood from the Soonderbun *Cala jungul* are carriage of too large calibre to remain in the Canal, even for that period; succeeded as one set is by another. The individual stoppages may be temporary; the obstacle to free navigation is permanent.

* ? 3 days.—J. M.

We have other obstructions to navigation in these terminal Canals in the contracts made with fishermen whom, where natives are concerned, I have known stoutly to dispute passage when their nets were being drawn, and—backed by peadas of parties whom

they called their Zemindars—positively to seize and fine boatmen who have persevered to force a passage at the risk of injury to the nets, which of course were declared to be irremediably injured.

We have further obstructions in the same Canal presented in the extortion practised by the toll-gatherers. A boatman coming in with a fair tide and anxious to avail himself of it to reach Calcutta with as little delay as possible, finds himself obliged to fee the men to get his ticket for him in time. If inflexible, he may cool his heels as long as it suits the unfeeds', as a plausible excuse is easily got up, during the crush of boats to get in or out, for serving some one else before him. Owing to the illiterate character of boatmen, generally, I should not wonder if it were often attempted to take from them a larger sum than a receipt is given them for, which receipt is properly calculated. I give this as my opinion, because I have seen it sometimes practised, and see no reason therefore, being tolerably familiar with the character of the Bengallee underlings, why it should not be tried on, whenever possible.

Besides the extortions of the Toll gatherers, the navigation by the Canal route has to bear up in many cases against those of the Salt Chokies. There is one of these half-way in the Chultabarreah Canal, and another at Rogepore at the Eeshamuttee extremity of the Hoseinabad Canal, both of which are notoriously lucrative places, and the officials of which, I have seen receive as much as an eight anna piece at a time from a Backergunge boat; others pay in kind—some by a *pallee* of rice; others, by a fowl; and so on. I have known boats, emboldened by seeing a *Saheb's* boat in the neighbourhood, refuse to pay the demand and been accordingly chased and boarded by men from the *chokie* in the little coracle they have always at hand; and when I interfered and boarded the boat simultaneously with themselves, I have been met with the utmost effrontery and coolness, and though I heard their previous demands, have been told that they were only in the exercise of their duty searching for illicit salt. I regret to say that on some occasions when I have brought this matter to the notice of the proper authority, I have been told it was impossible to be rectified; that if one chokei man was dismissed, a still more hungry and, therefore, more rapacious successor would be appointed; and was significantly reminded of the fable of the Hedgehog and the Fox. I have indeed been entreated on one occasion, by the sufferer himself, not to interfere, as he would only suffer doubly and under greater malice when I was out of the way, as his avocations made him a constant passenger by the route. The remark was too sensible not to be followed, and I have since contented myself with accurate observation in hopes of an opportunity, like the present, when radical reform might be effected.

Beyond extortionary obstructions, we have navigatory ones. These are:—

1. *Lesser obstructions;* { Fisherman's stakes. Sunken boats. Stumps of trees. Tracking paths impeded by jungle. Tracking paths impeded by intervening *Khals*.

2. *General want of depth in the system of Canals*; especially at Choolkonee, Bhowanneepore, and Bhangor.

The streams, under tidal influence, run so strong in the Soonderbuns, that at the coming in of the flood, for instance, it is in some of the Canals hazardous to start till the whole current is running at a uniform rate. With such rushes it will be easily understood how in or at the mouth of narrow straight water-ways as the Canals all are, the dangers of stakes, sunken boats and tree stumps, are more than ordinarily, great and less, evitable. Wrecking is too much of a profession among the population on Soonderbun grants to render the clearance of the channels by the residents on their banks a matter of probability. Sometime ago, I applied to several of the River Insurance Offices in Calcutta for a statement of the losses they had suffered within the previous five years from losses of

boats in the Soonderbuns. This of course would have included the Attara Banka as well as the Canal Route, but the answers were to the effect, that though perfectly sensible of having lost much by the routes in question, they were not in a position to say how much, or where. The parties at the same time cordially concurred in the wish that I would represent the matter to the proper authorities, which I did, but nothing came of it.

One obstruction in regard to tracking paths, is the jungle which extends to the water's edge, and in case of adverse tides prevents the use of the tracking rope. Regarding this jungle, it must be understood that as concerns allotments of Government lands to Grantees, it grows upon land that is specially reserved by Government for the construction of tracking paths. All our pottahs—I speak as owner of several of these grants—except from the grant a strip of land 60 feet wide, bordering on the Canals. Under these reservations it is a little too much to expect us to do for Government, what it contemplated doing for itself, and which drawing the revenue it does from the Canals, it is so much better able to do. It must further be recollected, that the jungle left on this strip of land is as good as a hedge to the cultivated portion of the lot beyond, against the incursions of the predatory boatmen, a race well known in the Soonderbuns.

In spite of these considerations, several grantees—I think I may name Messrs. McPherson and Harris among the number—have offered if Government were to clear the jungle in question, they would prevent its becoming an obstruction again, and would give their own bunds as tracking paths for the passing boatmen in order to get rid of the eyesore which the jungly appearance of the banks made them. The offer, as far as I can recollect, was declined on the ground that the fund set apart for the repair and improvement of all the Canals (being 700 Rs. a year !) was inadequate to the disbursement required. Understanding as I do that the annual income drawn, in net, from the Canals is 1,50,000 Rs., this 700 Rs. is about the *smallest* per centage that was ever allowed in any mercantile speculation for wear and tear of block.

The other obstruction to uniform tracking is the interruption offered by little *Khals* or streamlets, just too deep to be forded, especially where alligators are not wanting, and too narrow to make it worth while to take the trackers on board to the other shore.

The greatest drawback however, upon the usefulness of the Canals, is their general want of sufficient depth. Commencing at the Entally Canal, we find it converted into little better than a wet dock for middle sized boats. The Circular Canal itself, though about the best scoured, is not passable with facility in every part at any time. Even in the Lake Canal which is the deepest, there is at the toll gate terminus a bar affording serious impediment when the ebb runs low. In the Chultabareah Canal there are portions which we may call just wet at low water, and the same in the Bhangor Canal, above and below the *haat* As for the Bhowaneepore and Choolkonee Canals they are in parts perfectly dry at half tide, and their utility as part of a continuous system of Canals is rendered entirely nugatory by the circumstance. I have come from Bagundee down the Eeshamuttee and the Hoseinabad Canal, starting with the the first of the ebb, and been, though going in a light and fast pulling *pansway*, stopped for want of water at the mouth of the Choolkonee, which was then completely dry. The loss of time thus incurred by the larger class of boats is great, in waiting out the last half of the ebb and the first half of the coming tide to get through this one Canal, after which they are obliged to track through the next Canal of Bhowaneepore against the remainder of the flood, till they come to the Akratulla, when the flood which would there become favourable has run out. Every start in these Canals for boats beyond a very small size is regulated by the tides, and a very annoying interference with the comfort of travelling by the Canals is thus occasioned by the shallowness of these two in especial. In 1840 my father, then the owner of the grants on both sides of the Choolkonee and of

the grants on the northern side of the Bhowanneepore Canal, remonstrated with the Canal Office on their state, and strongly urged re-excavation, but the answer was that the pressure of the Affghan war permitted no such undertaking. The consequence is that the larger boats, those above 700 maunds, from the eastward in fair weather, prefer the Attara Banka route in choosing at Goodlad's Creek, as the less harassing, and scarcely more tedious. I say scarcely more tedious because I have during spring tides in February, gone in a large English built cutter, using her sweeps, from Balliaghat to Hoseinabad by the Attara Banka in two days. I may state here with reference to the question to that effect, that I do not, from what I have seen of it, think the Attara Banka passage, dangerous at present. Cultivation is beginning to fringe it on the northern bank of the line, and the intervals between the haunts of population is daily diminishing. The improvement of the Canal line is now, I apprehend, desirable upon other grounds than the pure dangers of the lower route. The larger Boats those above 1000 maunds, there are some as high as 5000, will naturally prefer the wide channel and sailing room of the broad rivers, and these will consequently convey the trade of Arracan, Chittagong, and Sylhet, while the more compact and smaller boats from Dacca, Mymensingh, Rungpore, Furreedpore and Jessore coming from a higher latitude, will be glad to avail themselves of the route so much higher up and in a nearly straight direction; economising time and ensuring safety; results that will be still further identified if the remainder of Major Schalch's plan is carried out by the completion of the line to Khoolna.

19. From the lengthened statement I have given above of the present character of both the Eastern routes, the Committee will readily elicit the opinions I hold of their advantages and disadvantages—that neither is likely to be altogether superseded by the other, that both have defects but not any radical—and that the defects they have are capable of amelioration if not of entire cure.

20. The obstacles and impediments to the Canal Navigation, enumerated as above, almost suggest their own remedies.

The first thing required is to give the fullest effect to the system now in existence by deepening the several portions choked up, and resorting to some comprehensive plan—one if I mistake not, was proposed by Capt. Prinsep when he superintended the excavation of these Canals—for periodically scouring them. As this is a matter of engineering detail, I shall not presume to say any thing further upon it, feeling sure that it will present no difficulties to the able officer in charge of the department.

The second, would be to assist boatmen in making themselves independent of tides, so far as accident may render requisite, by the construction of a continuous tracking path on both sides of the line of Canals, and (I should say) such connective streams between the Canals themselves, as the *Choumookee*. The tracking path should be a solid bund placed at least 20 feet from the water's edge for permanence sake, in which case the first expence would be all that would have to be met; and I might safely say that, as far as is bordered by Soonderbun grants, not a Grantee but would relieve the Government from all future expense as to their preservation in perfect efficiency, the mode and extent of repair being prescribed by the Canal Engineer. Besides this uniform line of tracking bund, I would suggest the erection of small cheap wooden bridges over such intervening Khals in the line, as the interests of landholders might induce them to keep open; there being very few of them so required.

21. The next point to be considered is the formation of an efficient Police devoted exclusively to the superintendence of the Canals. There will be no lack of duty for such an establishment; to watch over the navigable state of the line, to report obstructions, to inquire into reported cases of extortion and bring the offenders to punishment—we have the nucleus of such an office in the Superintendency of Canals and Bridges, but much larger European assistance in the subordinate parts appears requisite. There should be at least two

European patrol-overseers circulating through the Canals from end to end and time to time. It would be the only cheap and (with cheap,) effective way of securing the objects aimed at, as equally honest, experienced, active, and able Native agency for such purposes could not be had for the same remuneration. With *eyes* and *hands* of this character, the Engineer officer (invested at the same time with magisterial powers) who presides over the Canals' and Bridges' Office of Calcutta, will be adequate, with very little additional establishment, to the complete control of the Eastern Canals as the system exists. Should additions be made to the system, they of course will necessitate an increase.

22. That some additions are requisite and others desirable, is I think undeniable.

The most prominent is a harbour at the entrance of the Balliaghat Canal, to contain the boats that do not pass directly into the Hooghly, or require more than two days to unload their cargo. There is at the spot indicated the nucleus of such a wet dock, but it is not large enough. One sufficiently large to hold the entire amount of boatage now frequenting the Canal would be a desideratum: the earth from the excavation being used to solidify the banks of the docks towards Calcutta to allow of the erection of Store-houses for the cargoes which, when the docks come into use, will have necessarily to be there erected By such a measure the Canals (Balliaghatta, Circular, and Entally) will become the free passages they were intended for; they will be more freely ventilated and cleansable, and the neighbourhood, now unpleasant, become more healthy. At the same time the extension of the suburbs eastward will permit of local improvements which at present are utterly impossible. Along with the wet-docks, we may have a tram-road constructed on the southern bank of the Balliaghat and the Entally Canal from the docks to the Dhurrumtullah road, giving the greatest facility to the transport of those heavy articles of trade, which to secure us the convenience of Canal transit will be necessarily disembarked at the Dock-storehouses. The ground indicated for this tram-road, is now partly choked up by fences and old walls and is partly a most wretched hackery road, dangerous to the last degree in the rains from its heavy ruts and abutment over against the Canal.

23. Another addition to the present systems of Canals, that I would suggest, is a Canal between the two Soonderbun allotments known as Nos. 19 and 20 of Capt. Prinsep's Map B. Its value and advantages were brought to the notice of Capt. Boileau in 1840 by my father, and are so fully detailed in the communication (now I believe in the hands of the Committee) on that occasion, that I shall not needlessly attempt to recapitulate them. The suggestion met with Capt. Boileau's fullest approval, and nothing but the pressure of the Affghan war (we were told) prevented it from being then carried out.

24. The extension of the Canals to Khoolna according to Major Schalch's original plan is an idea, the commercial results of carrying which out, there can scarcely be a question, will be very beneficial. It will give a direct and safe passage to the Jessore inlets, obviating the necessity of the circuitous and sinuous passages by the Cobbaduk and Goodlad's Creek Of its engineering difficulties a survey by a professional officer, will give the best idea and elicit the grounds upon which the plan as originally devised, or with local modifications, may be embodied in a formal report. However there is enough of time for this, when the more immediate necessities of the Eastern Canals have been provided for: *they* are urgent.

25. The Attara Banka route will improve as the cultivation on its banks extends: and that extension will be only a sequel to the cultivation of the Northern grants. These are progressing, and their clearance and settlement will be accelerated as the Canal route is improved. A determinate pressure once given to clearance southward, the move of improvement will be determinate. The causes that have hitherto hindered such regular and uniform clearance are connected with a subject which is irrelevant to the Committee's inquiries and which, it may therefore be considered necessary to apologize for having alluded to.

26 In suggesting a regular Police of the Canals, I of course include among its functions the eradication of all the dangers attendant upon the passage, and otherwise increasing its comforts. To one particular however, the digging of a large tank at each of the anchorages (if I may so term them) on the route, the attention of the Committee may perhaps be advantageously directed, as the increasing resort through the Canals renders it impossible for the Grantees on the banks to supply water to all comers from their own stores. Our own population take up our care, and with their wants in the dry season we have enough to do.

27 I have now as far as my recollection goes, laid before the Committee thus much of the information at my disposal as appears to bear upon its objects If there are more specific queries which it is desirable to aid in answering, I shall be happy to do so if they are within my ability

I have the honour to be

GARDEN REACH
June 1st, 1846

Your most obedient Servant
S G TOLLEMACHE HEATLY

No XXXVI

No. 43

To THE HONOURABLE SIR J P GRANT,
Chairman of the Municipal Inquiry Committee

SIR,

Calcutta, 16*th June*, 1846

In reply to your Letter No. 3064, of the 15th instant, I have the honour to inform you, that the repairs to the banks of the Soondurbun Canals therein adverted to, were duly executed under the superintendence of Captain Goodwyn, agreeably to his Estimate sanctioned by Government on the 24th September 1843.

2nd. The Estimated Expense of the above repairs was Rupees 4,368, but the actual outlay appears to have been Rupees 3,726: which sum is included under the head of "General Current Expenditure" for 1841-45 in the "Return of Expenditure on the Canals," furnished to the Municipal Committee along with my Letter No. 29 of the 5th August 1845

I have the honour to be,
SIR,
Your most obedient Servant
W RUTHERFORD, *Captain*,
Ex Officer of Canals.

No. XXXVII.

No 3025

To CAPTAIN W. RUTHERFORD,
Superintendent of Canals.

SIR,

Under instructions from the Chairman of the Committee upon Municipal Improvements, the Honourable Sir J. P. Grant, I am directed to draw your attention to the annexed communications, and with reference to them to request the favour of your furnishing the Committee with a Copy of the separate or joint Report of Captain FitzGerald and Captain Goodwyn, if such Report was made, upon the difficulty or otherwise of Damming up the Gobra Khal, with reference to an Estimate No. 7, for the above work, by Captain Goodwyn, submitted to the Military Board *in June* 1843.

I have the honor to be
SIR,
Your most obedient Servant.
(Signed) J MORRIS,
Clerk to the Committee

MUNICIPAL OFFICE, TOWN HALL
2nd January, 1846

No. XXXVII. *a*.

No. 3015

To CAPTAIN H GOODWYN,
Civil Architect

DEAR SIR,

With reference to an Estimate No 7, submitted by you to the Military Board through the Superintending Engineer L. P. (Captain FitzGerald), *in June*, 1843, of the probable expense of Damming up the Gobra Khal, amounting to Rs. 5 347 : 6 : 0, and which the Board, at the suggestion of Captain FitzGerald, declined approving till Captain F. and yourself were able, at a more favourable season, to become better acquainted with the difficulties, &c. of the work, I am directed by the Chairman the Honourable Sir J. P Grant, to inquire of you whether Captain FitzGerald and yourself took measures of informing yourselves further upon the subject, and if so, what was the result, and whether the result was reported to the Board.

I am, Dear Sir,
Your's faithfully,
(Signed) J. MORRIS,
[*Clerk to the Committee*]

MUNICIPAL OFFICE, TOWN HALL
26th November, 1845.

No. XXXVII. *b.*

To J. MORRIS, ESQ.,
Town Hall

DEAR SIR,

I did send in a Report and Estimate for the Gobra Khal work, and the reply of the Superintending Engineer and Military Board will be found, together with my Report and all other information, in the Office of Captain Rutherford, the present Superintendent of Canals, in "Camac Street." The exact purport of the Board's reply I forget, but the cost of the work was deemed disproportionate to the anticipated benefits.

Your's faithfully,
(Signed) H. GOODWYN.

(A True Copy.)
(Signed) J. MORRIS.
Clerk to the Committee

No XXXVIII.

No. 254

To J. MORRIS, ESQ.
Clerk to the Municipal Committee
Calcutta, 9th January, 1846

SIR,

In reply to your Letter No. 3025, dated the 2d instant, annexing Copy of Correspondence with Captain Goodwyn, I beg to state for the information of the Chairman of the Municipal Committee, that subsequent to the transmission of Estimate No. 7, dated 30th June, 1843 to the Military Board, there is no Copy or record in this office of any Report on the expediency or otherwise of Damming the Gobra Khal, either from Captain Goodwyn or the late Major FitzGerald

2nd. A Copy of the former Officer's Letter, forwarding the Estimate in question, and of Major FitzGerald's reply, No. 1704, dated 18th September 1843, is annexed, but no communication on the subject of a later date is forthcoming.

I am, Sir
Your obedient servant,
W. RUTHERFORD, *Captain,*
Ex Officer Canals

XXXVIII. *a.*

No. 148

From CAPTAIN H GOODWYN, *Engineers,*
Superintendent of Canals,

To MAJOR FITZGERALD
Superintending Engineer, South Eastern Provinces
Calcutta, 22nd July, 1843.

Sir,

I have the honour, in obedience to your No. 818, of 5th instant, to forward the Estimates for the reconstruction of Tow-paths and Damming the Gobra Khal, with the Sections and Sketch required. The Tow-paths of the Hosynabad and Baley Gunj Canals require only repair, and are charged at 10 Annas per 100 feet only

I have, &c.,

(Signed) H GOODWYN, *Captain, Engineers*
Superintendent of Canals

No. XXXVIII. *b*

No 1704

From MAJOR W R FITZGERALD,
Superintending Engineer, South Eastern Provinces.

To CAPTAIN GOODWYN, *Officiating Agent for Iron Suspension Bridges and Superintendent of Canals.*

Sir,

In reply to your Letter No 148, dated 22nd July last, I have the honour to mention, under instructions contained in the Secretary Military Board's Letter, No. 3,194, dated the 9th instant, that as the Board doubt the practicability of Bunding up the Gobra Khal, with reference to former Correspondences on the subject, they have transmitted to me the accompanying original papers as per margin,* and I forward them to you to enable you to investigate better the expediency of attempting to Dam the Khal in question.

* Proceeding, 13th April 1837, E. Proceeding, 15th June 1837, 4

2nd. Your Estimate for making improvements to the Soondurbun Canals has, the Board inform me, been recommended to Government.

I have, &c.,

Calcutta:
18th September, 1843.

(Signed) W. R. FITZGERALD, *Major,*
Superintending Engr., South Eastern Provinces.

(True Copies)
W. RUTHERFORD, *Captain,*
Executive Officer, Canals.

No. XI.

Extract of a Pamphlet entitled Observations on the advantages of a Wet-Dock, for the Port of Calcutta.—[Calcutta: printed at the Mirror Press, by P. Crichton, 1824.]

"As connected with a Wet-Dock at Kidderpore, a Canal for Ships from it to Channel Creek will be attended with the most important advantages to the Shipping and to the Port of Calcutta, and will complete the chain indeed of which the Wet-Dock can be considered only as the first link.

"In the observations on the advantages of a Wet-Dock, the difficulties of the River are stated generally, but on the present occasion it will be proper to go more into detail, to shew the necessity of some plan to overcome them, and which can so admirably be accomplished by means of a Canal.

"During the months of March, April, May and June, the difficulty of Ships getting down the River from the violence of the Southerly wind is great, and is attended with the most serious expences in the loss of Anchors, attendance of Pilots and Boats, and detention; causing demurrage—Ships are not unfrequently two or three weeks getting from Calcutta to Saugor, and are exposed during the whole of the time to great risks from violent Flood Tides, North-westers, and Bores—damaging their Sails and Rigging, losing their Anchors, and often injuring their hulls on the numerous and dangerous Sand Banks—The James and Mary Sand alone, it may be assumed on a moderate calculation, costs every Ship proceeding down the River during these months, a loss of three days, and one anchor.

"The month of July is perhaps the period of all others when Ships go up and down the River with the fewest impediments—the violence of the Southerly Winds and Flood Tides abate considerably during this month; there are no Bores, and the Freshes have not become strong.—These four weeks may therefore be considered as the least unfavourable for Ships proceeding both up and down the River during the year.

"August ushers in the Freshes—During this month and September, and also the half of October, the impediments presented to the progress of Ships up the River, are many, and are attended with great risk from the violence of the Freshes, the sudden coming in of the Bores, and the frequent Gales from the East; the South-east, and the North-east, especially in the latter months—Ships are not unfrequently five and six weeks in getting up to Calcutta, exposed during the whole of the time to a Fresh which often runs eleven knots an hour, and lose anchors, besides suffering severe injury—not to mention the frequent wrecks which happen in the River every year

"During the months of November, December, January and February, the danger is much lessened, yet the passage up the River is tedious and attended with delay—so as to make it a great inconvenience, and expence to Ships proceeding upwards.

"Thus it appears that during the year, four months are attended with extreme difficulty, danger and delay in getting down the River; three months equally so in getting up; leaving but one month out of twelve, in which with tolerable facility a Ship can proceed up or down, this most formidable River.

"To mitigate these obstacles to the progress of Ships navigating the Hoogly, various plans have been devised.—It has been proposed* to cut a Canal between Diamond Harbour and Fultah, so as to avoid the James and Mary, the most dangerous Sand in the River, and the public attention has been lately drawn to the towing of the Ships by Steam Boats.—The adaption of the power of Steam to Vessels will most assuredly form an era in Maritime affairs, and not the least to that of towing Ships—but to compare the assistance of Steam

* See App. (J) page 121, to Municipal Committee's 2d Report.—J. M.

Boats to the effectual remedy afforded by means of a Canal, would be like giving the preference to towing Ships round about through the Pentland Firth rather than going through the Caledonian Canal—and expensive and useful as that grand work has been, it is not more necessary than a Canal from Calcutta to Channel Creek, and which would not cost a 20th of the money.

"A Canal has been objected to on the score of expence, and the apparent uselessness thereof, when there is already a magnificent River.—This is not only a short-sighted* objection, which the preceding description of the dangers and difficulties of the Hoogly will completely meet, but in an enquiry of this nature we must descend from the general and the magnificent to the particular and the useful, and we need only state to render it completely striking, that a passage is often made from the Cape of Good Hope to the Pilot in less time than from the Pilot to Calcutta—and also that a Ship may sail from Bombay and anchor off Calcutta in less time than a Ship can go from Calcutta to the Reef-Buoy.—Examples are not wanting where Canals have been made parallel to Rivers to obviate the dangers and obstacles in the navigation of them,† and if ever a case applied, it is to that of the Hoogly where not only the dangers, the difficulties, and the expence of time and money, render it so exceedingly desirable, but where the level of the country and the nature of the soil contribute to make it so perfectly feasible and easy of execution.

"The distance from Kidderpore to Channel Creek, is 40 miles—and in the whole extent requires no Lock except one at each end. The Wet-Dock at the first mentioned place will preclude the expence of one of them, leaving but one Lock Gate to be built, to complete the greatest improvement to the Port of Calcutta ever thought of, the advantages of which we proceed to point out.

"A few prefatory remarks on the entrance into, and exit out of, Channel Creek, must first be made—The entrance of Channel Creek at its junction with the Hoogly is narrow, but with the aid of Steam Boats can be navigated with the most perfect safety and facility at all times by the largest Ships.—The direction of the entrance is West and East, whilst the line of the Hoogly and of the Creek itself along the East Coast of Saugor Island is North and South.—This cross direction to the line of the Hoogly makes a most perfect Harbour, Land-locked on every side, and protected from every wind—it is a singular coincidence that Kidderpore is the only place within ten miles of Calcutta where the River affords a proper situation for the entrance into a Wet-Dock, or Canal, and this is the only one down the River where the same object could be effected. In the Freshes Diamond Harbour might do, but in a strong Southerly or South-west wind, there is no place below Budge-Budge where a Ship could haul into a Dock or Canal—into Channel Creek however, in almost a gale of wind from any quarter a Ship might enter with the assistance of a Steam Boat—for when the sails could not act, she could always with the Steam Boat and tide easily accomplish it.

"In coming up the River in the Freshes, Ships could at once get up to the entrance of the Canal, as the Flood Tides as high as this, are sufficiently powerful during the strongest Fresh to enable them to move even with a contrary wind—and having entered the Canal—they can always in one day go up to the Dock—avoiding the dangers of the River, the loss of anchors, much detention in time, and the greatest part of the expence of Pilotage—and of Row Boats.

"In going out of the River, Ships can in one day go down the Canal from the Dock, and from Mud-Point the difficulty of getting down against the strong Southerly winds is little comparatively, as there is room to work a Ship, whereas higher up, it is owing to the

* See Appendix (H) page xxxi, Paragraph 9, to Municipal Committee's Report.—*J. M.*

† NOTE.—In the Hoogly itself, there is a Canal for Boats between the Roopnarain and Tingorocolly Rivers.

weakness of the Ebb Tides and the wind blowing hard in the contrary direction, that Ships will not drop, and to work them there is no room—which causes the great detention; they will thus save 2 or 3 weeks, avoid the dangers of the James and Mary and other Sands, together with that of the loss of anchors—a great part of the expence of the Pilotage and of Row Boats.

"Not only will the dangers, the difficulties, the loss of time, and enormous expences of the Hoogly be obviated by the Canal, but it will equally facilitate the navigation of Channel Creek, which would much benefit the Port of Calcutta, for from the entrance of the Canal, either passage might be chosen according to the winds or season of the year. For instance, during the blowing months of April, May and June, it would be easier getting to Sea under the Lee of Saugor Island, than on the Weather-side of it, where the expanse resembles a Sea—for completing large Ship's cargoes, which could not load wholly in the Dock, it would be decidedly preferable, because the smallest boats could with safety be employed to load them instead of the expensive Sloops at present in use; and for large Ships touching here, such as the Company's Ships going on to China, it would be a most superior Harbour to that of the new Anchorage, both on account of the stillness of the water, and that of the sending to Calcutta through the Canal their Bengal cargoes and getting their China ones on board.

"In Channel Creek, the Flood Tides are not near so strong as in the Hoogly—There are no Bores, and North-westers cannot affect Ships because they would lie protected under the Lee of Saugor Island—Neither are the Freshes so strong, as it is only a lateral branch of the Hoogly and receives no land floods but from it."

No. XLI.

Extract of a Report Dated February 15th 1841, *on the Rajmahl Canal, by the Rajmahl Committee.*

"2. Believing it to be generally admitted, "that opening and perfecting lines of interior communication," (more especially those leading from Capitals, having by sea, unlimited commercial intercourse,) has ever been found eminently conducive to national improvement, it is deemed unnecessary to offer proof of the assertion, further than by referring to the prosperous state of Britain and America, where such works abound and are multiplying, compared with that of any country, however superior in natural fertility, in which they have continued neglected, or are unknown.

"3. Bearing in mind that the Ganges receives, in its course through 1,200 miles of the central and infinitely improvable plains it fertilizes, eleven rivers, "several of them equal to the Rhine, few less than the Thames," and that when it has reached the head of the Delta at Rajmahl, its *distance from Calcutta* does not exceed 200 *miles;* and further having in remembrance, that during a great portion of the year, the only *passable* Channel for boats drawing 5 feet water, between the latter *City* (the Capital of India) and the station named, makes a circuit of 528 miles, (this chiefly through the perilous labyrinth of creeks and wood-encumbered straits, forming the wilderness called the Sunderbunds), it will readily be acknowledged, that amongst the good effects of opening a direct line of permanent navigation* between deep water in the Hooghly above Calcutta, and the great River at Rajmahl, there would be the highly important one of its affording the means of conveying safely, cheaply, and speedily to the Ocean outlet, *increased* quantities, and ultimately

* Also answering for irrigation.

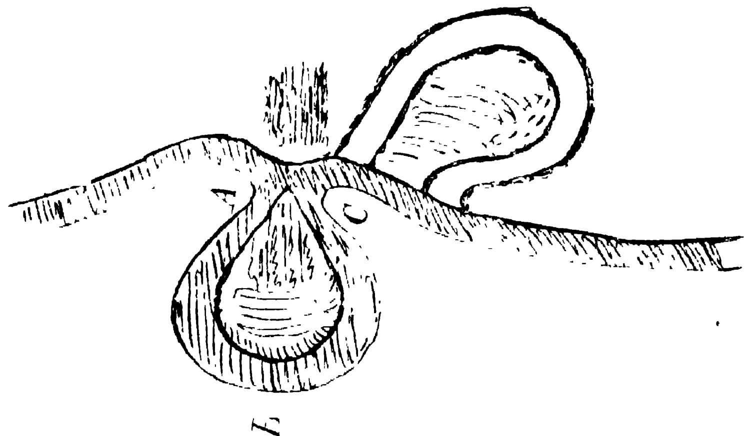
improved qualities of the agricultural and mineral produce of the entire regions traversed, nor this alone, as by inevitable commercial reciprocation, the same line would immediately serve for supplying these regions with augmented amounts of the sea-borne products or manufactures of other countries."

"28. If an attempt was made to rectify the exceedingly tortuous course of the *Bhaugirruttee River*, between the mouth of the Adji River at Cutwa, and the mouth of the Curree Nullah at Mirzapore, (or the lower end of the Canal in the Hooghly,) by cutting through the narrow necks of the intervening loops or horse-shoe bends, the immediate effect of such rectification would be its laying nearly dry for several months in the year the bed of the *Bhaugirruttee* between the Adji, and the shoals periodically formed in the *former* River near its exit from the Ganges; yet such rectification of the Bhaugirruttee has not infrequently been proposed as the means of *improving* its navigation; and were the Canal levelling sections of no other value, they would be useful in demonstrating that an outlay of money on attempts, by such cuttings, *to improve the communication through the bed of the Bhaugirruttee, could* only terminate in making it (if possible) *worse*.

"29. The comparatively great difference of level between the Bhaugirruttee at Cutwa, and (its continuation,) the Hooghly at Mirzapore, being in the direct line of its present course at the rate of 7.2652* inches in a mile, also explains the great tortuosity of its intermediate bed, and the cause of its constant shallowness in the dry season; as, running through the soft and sandy alluvial soil of the Delta of the Ganges, (which the Canal does not,) such soil could not possibly bear the abrasion and under-cutting incident to a current of 6 miles per hour, which it at least would be, during the inundation season, if the lower *third* of the course of the Bhaugirruttee were straightened so as to make its fall (what in a direct line it actually is) 7.2652 inches per mile.

"In such a soil, with such a velocity, the Channel, in place of continuing straight, necessarily acquires the serpentine curves, and circumflections, which the accompanying Map of it represents, and which, by reducing the fall, in its crooked course to $3\frac{1}{2}$ inches per mile, enables the banks, for a time, or until the neck of one of the loops is cut through, to bear the reduced current, but as the immediate effect of this natural rectification is an increase of fall per mile in the bed adjacent,† and consequently a great *local* increase of velocity, it is invariably found that each such event precedes, and occasions, the formation of a similar horse-shoe-bend, pointing in an opposite direction, in the thus ever-changing natural Channel.

† Suppose the bend A, B, C, be 10 miles in length.



And to have a fall from A to B, and B to C, at the rate of $3\frac{1}{2}$ inches mile, and that the cut A C being one mile in length, is formed, it is evident that the total fall in this cut of *one mile*, will be $3\frac{1}{2}$ inches × 10=35 inches, or nearly 3 *feet*, and consequently that the velocity of the current passing through it, will be so increased as to produce the effect s described.

* See page 188, of Calculations, also Lieutenant Cunningham's Table of the fall of the Ganges "and Bhaugirruttee," Division 3rd of his Report.

being in consequence liable to the impracticabilities pointed out, would certainly be as unfavorable for "permanent navigation," as could well be imagined

We also may state, that the line having thus been formed, it will diminish the navigable distance from Calcutta to Rajmahl for the River Steamers,* during the large portion of the year they are now obliged to pass round by the Sunderbund Channels, 326 miles.† It may moreover be noted that, as during the same period the same distance of 326 miles would be saved to nearly all the vessels and country craft employed in carrying passengers, produce, manufactures, military stores, troops, treasure, &c, between Calcutta and the Ganges, the effect, as concerns expeditious transit, of opening such a line, would in some measure be tantamount to that which would proceed from providing each and all of the descriptions of craft referred to with Steam Engine power.

* The reason assigned for not admitting Steamers into the Calcutta Canals is, that they would injure the banks of any Canal not faced with masonry, and would necessitate the Canals being cleared of Boats when the Steamers were about to pass through.—J. M

† The distance by the Sunderbund Channel is 528 miles, while that, 72½ miles by the Hooghly and 129½ by the Canal, only amounts to 202 miles, and 528—202=326 miles

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F I N I S.

BISHOP'S COLLEGE PRESS :—CALCUTTA

30. As the above description applies generally to the northern *portions* of the Rivers of the Sunderbunds, or to those of the Delta of the Ganges, not directly and powerfully influenced by the tides of the head of the Bay of Bengal, the slightest *inspection* of any tolerable Map, showing the present course of these Rivers to the southward from the Ganges and the numerous intermediate jheels, or stagnant pools, which at one time formed portions of their Channels, will prove that an alluvial region which has been so traversed over by these streams, and which is still as much as ever subject to being again traversed by them, is as badly as possible adapted for the site of a *permanent* line of water communication from the Hooghly above Calcutta to one of the easterly Sunderbund streams leading to the Ganges. Yet within the last few years, the opening* of such a line, crossing by locks and loose brick Dams, large and deep Rivers, constantly liable to the changes that have been adverted to, has been seriously proposed. Nor, so situated and constructed, could there be but two objections to undertaking such a work, the one, that from the nature of the Dams proposed, it would be nearly empty in the dry season ; the other, that from the peculiar construction of the locks exhibited, it would in the season of inundation be impassable. The latter objection might apparently have been got rid of by leaving the *locks open* during *this* season, but being useless in the dry months, this would have been tantamount to totally omitting them from the plan, a measure that (as *correctly* affirmed by its inventor) would have led to another extraordinary inconvenience, namely, the speedy filling up of the very deep (and consequently very costly) Channel proposed to be excavated by alluvion thrown into it by the inconstant and ungovernable Rivers crossed. The million-horse power of those Sunderbund Rivers cannot be trifled with, by brick *Dams, &c.* but even had other Dams of solid stone masonry, or such as would have had a chance of resisting the force of their currents, been proposed, it is sufficiently evident, that their only effect would have been to make the streams (as is their habit) form for themselves new and comparatively unobstructed Channels.

31 The Committee appointed in 1831, to Report "whether there be any and what "prospect of keeping the Bhaugirruttee River open, or, of essentially improving the na- "vigation of it by any means at the disposal of Government," after arriving at the conclusion that there *was not*, and that the certain result of forming a cross Channel between one of its upper reaches and the Ganges, would be the early filling up of this Channel by shoals of alluvion, similar to those annually deposited in the Bhaugirruttee itself, recommended the construction of the Rajmahl Canal, or of the one immediately under consideration, expressly, on the ground that "no cut running nearly east and west, therefore "generally at right angles to the main discharging branches of the Ganges, will ever "be found permanently favourable for navigation"

This Committee consisted of Colonel McLeod and of Captain Forbes (Engineers), and of John S. May, Superintendent of the Nuddea Rivers ; and bearing in mind that the party last named was one of those who, on the grounds alluded to, and on *others* stated in the Report, joined in urging on the attention of Government the superior facilities for permanent navigation that would be afforded by the Rajmahl line, it appears inexplicable how he could subsequently have fallen under the delusions which led to his proposing the line from the Hooghly to the Goroy, referred to in the preceding 30th paragraph ; and which, running nearly "east and west across some of the main discharging branches of the Ganges," and

* Referring to Colonel A. Galloway's proposed Canal from Maugrah to the Hoogly, Estimated by J. P. May, Esq., Superintendent of Nuddea Rivers, to cost Rupees 36 Lacs.

See Military Board's Proceedings, 24th January 1833, Nos 34, 35, 37, and 38.

Ditto,	ditto,	27th September 1835, No. 27.
Ditto,	ditto,	3rd May 1839, Nos. 45, to No 48½.—J. M

APPENDIX TO APPENDIX J.

TO

SECOND REPORT OF COMMITTEE

UPON

THE FEVER HOSPITAL

AND

MUNICIPAL IMPROVEMENTS:

CONTAINING

CORRESPONDENCE RESPECTING TOLLEY'S NULLAH, AND SUGGESTIONS FOR IMPROVING ITS NAVIGATION, ETC.

CALCUTTA:

Bishop's College Press.

1848.

APPENDIX TO APPENDIX. (J)

Index.

Papers selected from the Government Records relative to Tolley's Nullah.

have fixed to the appropriation of the sums appointed for public works, to make the advance requested by him, that he, Major Tolley, will undertake the completion of the proposed Navigation without any expense to the Company, and to finish the same in 3 years, in consideration of a Grant being made to him of a Toll for 12 years, from the commencement of the work, of 1 per cent. on the Aurung Invoices of all Goods brought by that navigation. .. ..

Public Department Consultation, 28th December, 1775, No.21.

No. 5. Letter from Major Tolley, dated 29th November 1775, to Government, with reference to the proposed Channel from the Salt Water Lake to the Hoogly River, transmits Plans of the Survey, both to the Northward and Southward of Calcutta, in which the most eligible lines for that Channel are laid down, also the difference of the Level between the Lake and the River, and states, that as Security against Damage in the rainy season, he proposes to raise a high broad Dam on each side of the above Channel, to prevent the circumambient waters on the low grounds from communicating with the Channel. That the quantity of ground required is about 400 Biggahs; that a great part of which is paddy and waste ground; and that the line does not interfere with any houses till it comes to Chuckerbere and Bhowanipore, and the most of these houses are small and built of mat, and the Channel might be carried by the way of Kally Ghaut, which would have the advantage of not interfering with private property; that in point of public utility, the line marked at Nimtullah Ghaut, in the centre of the Town, is by much the most preferable direction for the proposed Channel, except that the expense would be double that of the Southern line, which he would recommend in preference to any other line to the Northward than the one proposed. ..

Ditto, 16th January 1777, No. 6.

No. 6. Letter from Major Tolley to Government, dated 2nd September 1776, transmitting, in conformity to the Order of Government of the 3rd January 1776, the Paper marked No. 6. *a*. ..

This Paper not received by the Municipal Committee.—J. M.

No. 6. *a*. Rough Draft of a Grant to Major Tolley, of the privileges of the Canal which he proposes to execute. .. .. ..

Ditto ditto, No.

No. 7. Order passed by the Government, stating, with reference to the Rough Draft of the Grant framed by Major Tolley, the terms upon which the Government consent to allow Major Tolley the privileges of the Tolls on the proposed Canal. .. .. ..

Ditto, 21st April, 1777, No. 15.

No. 8. Letter from Major W. Tolley, dated 20th February 1777, to Government, with reference to the Papers marked No. 6. and No. 7. states, that in consequence of the high rate of interest at which he obtained the means of executing his Canal, he will think himself fortunate if at the end of the short period of the grant

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he escapes only with the empty name of Projector; that his present line of Canal by the way of Gurriah is 7 miles longer than the line first proposed, which being found impracticable, he was obliged to abandon; that his present line of Canal entails the absolute necessity of forming, at a great cost, a Channel across the Lake to connect the Canal with the Tarda Nullah; that under the above and other circumstances mentioned by him, requests the various Nullahs communicating with the Lake and certain allotments of Land near the Lake and the sides of his Canal, also the privilege of forming three Marts along the line of Canal, and of establishing a Chowkey at the extremities of his Canal, may be granted to him in perpetuity, paying after a certain time, an annual rent to the Government. .. ..

No. 9. Letter from Major Tolley, dated 24th March 1777, to Government, stating, that as the execution of the Grant is prevented till the Government are sufficiently acquainted with the necessity of widening the Khontoncautau Nullah, he for the present begs to recede from the article in the Grant, which requests the establishing a Chowkey to collect Toll at that Nullah. .. .. — Public Department Consultation, 21st April, 1777, No. 16.

No. 10. Letter from Major Tolley, dated 11th April 1777, to Government, offering to farm certain Hauts on the banks of his Canal. .. .. — Ditto ditto, No. 17.

No. 11. Minute by the Governor General, on the Paper marked No. 8, stating the terms upon which the Grant to Major Tolley could be complied with. .. .. — Ditto ditto, No. 19.

No. 12. Order passed by the Government, directing, that the Draft of the Grant to Major Tolley prepared by the Secretary to Government, be sent to the Company's Attorney, for him to compare it with the Government Resolution of the 21st April 1777, and if regular and conformable thereto, to certify the same. .. .. — Ditto 24th July 1777, No.

No. 13. Letter from the Company's Attorney, dated 28th July 1777, to Secretary to Government, stating, that the difference between the Draft Grant of Major Tolley's and that by the Government is, that the first was an absolute Deed of Gift, which never, without the sanction of Major Tolley, could revert to the Company, whilst the latter is a Lease for 12 years only, with a quit rent reserved. .. .. — Ditto, 28th July 1777, No. 12

No. 14. Letter from the Company's Attorney, dated 3rd September 1777, to Secretary to Government, transmitting Major Tolley's Lease* engrossed on parchment. .. .. — Ditto, 4th September 1777, No. 5

*This Paper not received by the Municipal Committee.—J. M.

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put aside when the Bhadarrey duties were abolished by the Regulation of the 14th April 1773. .. ..

No 21. Letter from Calcutta Committee Revenue, dated 24th August 1781, to Government, transmitting the Paper marked No. 21. *a.*, and stating, that not feeling themselves authorized to comply with Major Tolley's request, they beg the orders of Government thereon. .. .. — Revenue Department Consultation, 11th September 1781, No. 14.

No 21 *a.* Letter from Major Tolley, dated 24th August 1781, to Calcutta Committee Revenue, stating, that the Merchants who import Firewood into the Canal are much in want of a place to land it at, and requests some waste ground, about 50 yards in breadth, contiguous to the Canal and between Belvidere and Mrs. Levier's, may be granted to him, on paying a Revenue for the same. .. .. — Ditto ditto, No. 15.

No 22. Extract of a Letter from the Honorable Court of Directors in the Public Department, dated 11th April 1785, stating, that it had received a Memorial from Mrs. Anna Maria Tolley, widow of the late Lieutenant Col. W. Tolley, praying for an extension of the Lease of Tolley's Nullah granted to her deceased husband; that the Court being satisfied of the utility of that Canal, and of the considerable expense incurred by Lieutenant Col. Tolley in forming it, directs an extension of the Lease be granted to Mrs. Tolley for the term of 15 years, after the expiration of the present Lease, under such regulations and strictures as are specified in the accompanying Paper,* framed by the Company's Solicitor for the above purpose. .. .. — Public Department Consultation, 1785

*This Paper not received by the Municipal Committee. - J. M.

No 23. Letter from J. H. Wilkinson, Esq. the present Proprietor of Tolley's Nullah, dated 15th January 1788, to the Members of the Board of Revenue, stating, that upon opening the New Bridge at Kidderpore, there will remain unoccupied a tract of ground, being the old course of Tolley's Nullah, and requesting that the same may be granted to him upon his paying for the value thereof. .. .. — Revenue Department Consultation, 21st May 1788, No 25.

No 24. Letter from the late Acting Collector of Calcutta, dated 19th April 1788, to the Members of the Board of Revenue, stating, with reference to the application of the present Proprietor of Tolley's Nullah for a tract of land at Kidderpore Bridge, that the same might be claimed by Mrs. Tolley in virtue of her Grant, and accordingly there appears to be no objection that the ground in question should be granted to Mr. Wilkinson during the period he retains the Grant of the Nullah. .. — Ditto ditto, No. 26.

No. 25. Correspondence connected with the complaints against the Farmer of Tolley's Nullah, of undue exaction at Tolley's Nullah. .. — Ditto, 19th April 1793, No. 1 and No. 6. Ditto, 3rd May 1793, No. 9 and No. 16. Ditto ditto, No. 6, 7, and No 10.

Public Department Consultation, 11th September 1795, No. 16. No. 26. Letter from the Attorney of Mrs. Tolley, dated 13th August 1795, to Government, stating, that having understood that Government have lately had under consideration the cutting a new Canal for the purpose of improving the Internal Navigation, between the Metropolis and those parts of the country lying to the Northward and Eastward of the Metropolis, and that the only obstacle to carry into execution that very important and useful measure is the 9 years which remain unexpired of the grant of Tolley's Nullah, he begs leave to submit to the consideration of Government, as Acting Attorney of Mrs. Tolley, a surrender of her interest for the unexpired period of the grant, upon receiving an equivalent for the same; that the Nullah has been let during the last seven years at an annual rent of Sa. Rs. 51,600, payable by equal monthly instalments of Sa. Rs. 4,300, and transmitting the Paper marked No. 26. *a.*, by which it appears, that the present value of the Nullah for the unexpired periods of 9 years in Company's Paper at 6 per cent., is Sa. Rs. 4,12,495. .. ..

Ditto ditto, No. 17. No. 26. *a.* Statement of the value of Tolley's Nullah, 9 years of the Grant from the 1st July 1775, unexpired, ...

Ditto ditto, No. 19. No. 27. Letter from the Attorney of Mrs. Tolley, dated 7th September 1795, to Secretary to Government, with reference to the dangerous state of Surman's Bridge, requests the Government will favor him with the use of a Pile Engine, and the services of 2 or 3 Company's Khalasees, who are accustomed to driving piles. ..

Ditto ditto, No 20. No. 28. Letter from the Secretary to Government, dated 9th September 1795, to Mrs. Tolley's Attorney, complying with the request contained in his Letter marked No. 27. .. .. ..

Ditto ditto, No. 21. No. 29. Letter from the Attorney of Mrs. Tolley, dated 10th September 1795, to the Sub-Secretary to Government, in reply to his Letter relative to remedying the inconvenience that the Company and Passengers might otherwise suffer, whilst the Allypore Bridge is under repair, states, that being informed the Ground to the Southward of the Nullah between the two Bridges, except the space of 20 feet for tracking, had been claimed as belonging to Mr. Barwell, that he had applied to the Deputy Governor and Managers of the Orphan Society, who rent the Estate from Mr. Barwell, for leave to pass through that ground, as had been permitted when the Belvidere Bridge was building; and transmits the Paper marked No. 29. *a.* ..

Ditto ditto, No. 22. No. 29. *a.* Letter from the Secretary of the Orphan Society, dated 9th September 1795, to the Attorney of Mrs. Tolley, stating, that permission for Ladies and Gentlemen, in their carriages and Palankins, or on Horseback, to pass through the grounds of

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. Kidderpore House has never been denied, but it would be improper for them to authorise the public an unlimited passage through those Grounds; that there is a Road leading from the South-west along the Banks of the Nullah, which has been for many years used and considered as a Public Road, and which could be used with greater convenience for the transportation of Timber, than the Road through the Society's Grounds. .. ..

No. 30. Resolution passed by the Government, directing that Mrs. Tolley's Attorney be informed, that the Governor General in Council cannot agree to the terms he has proposed for the surrender of the grant of Tolley's Nullah to the Company: the terms being unreasonable, and no deduction or allowance made for repairing and rebuilding the present Bridges, which are in a dilapidated state, or for the lessening and abolishing many of the present Tolls. .. .. — Public Department Consultation, 11th September 1795, No. 18.

No 31. Letter from Mrs. Tolley's Attorney, dated 21st September 1795, to Secretary to Government, requesting to be informed on what terms the Government would be disposed to accede for a surrender of Mrs. Tolley's remaining 9 years interest of her grant. .. .. — Ditto, 25th September 1795, No. 7.

No 32. Letter from the Secretary to Government, dated 25th September 1795, to Secretary to Board of Revenue, requesting the Board's opinion and report with respect to the amount of the compensation which the Board think may reasonably be allowed for the surrender by Mrs. Tolley, of her remaining interest in the Grant of Tolley's Nullah, taking into consideration the Collections of the present duties on Boats and Merchandise passing through the Nullah, and whether any, and what, remission thereof should be authorized when the grant has been made over to the Company. .. .. — Ditto ditto, No.

No. 33. Letters from the Members of the Revenue Board, dated 5th April 1796, with their Proceedings annexed, to Government, stating that they, the Board, think that Rs. 2,98,569, is a sufficient compensation to Mrs. Tolley for the proposed surrender of her remaining interest in Tolley's Nullah. .. .. .. — Ditto, 29th April 1796, No. 17 and No. 18.

No. 34. Letter from the Secretary to Government, dated 31st May 1804, to the Board of Revenue, stating, that as the Lease granted to Mrs. Tolley will expire on the 4th July next, the Governor General in Council desires, that you will be prepared to take charge of the Nullah, as also of the several parcels of ground, transferred by Mrs. Tolley to the Honorable Company, as a consideration for the above mentioned grant, together with the title deeds of the property in question. .. .. .. — Revenue Department Consultation, 31st May 1804, No. 8.

Revenue Department Consultation, 12th July 1804, No. 5. — No. 35. Letter from the Revenue Board, dated 6th July 1804, to the Governor General in Council, transmitting the Paper marked No 35. *a*. .. ..

Ditto ditto, No. 6 — No. 35. *a*. Minute by T. Graham, Esq. Acting President, Revenue Board, relative to the future management of Tolley's Nullah. ..

Ditto ditto, No. — No. 36. Letter from Secretary to Government, dated 12th July 1804, to the Board of Revenue, in reply to their Letter of the 26th ultimo, states, that the Governor General in Council approves of the arrangement proposed to be adopted for collecting the Toll on Tolley's Nullah; and with reference to the Report on the state of that Nullah in 1796, by the Surveyor General, that orders will be issued for making the necessary excavations as soon as the season shall admit; that in the mean time the Committee for improving the Town of Calcutta, will be directed to state, what improvements they would recommend in that part of the Nullah which is in the immediate vicinity of the Town

Ditto, 26th July 1804, No. 11 — No. 37. Letter from the Secretary to the Revenue Board, dated 24th July 1804, to Secretary to Government, transmitting the Paper marked No. 37. *a*. .. ..

Ditto ditto, No. 12 — No. 37. *a*. Copy of an Advertisement which the Revenue Board propose to publish, respecting the Tolls of Tolley's Nullah. .. .

Ditto, 24th August 1805 No. 7. — No. 38. Letter from Revenue Board, dated 20th August 1805, to Government, transmitting an abstract statement of receipts and disbursements of the Tolls of Tolley's Nullah, from the 1st May 1804 to the 30th of April 1805. .. ..

Ditto ditto, No. 9 — No. 39. Letter from Secretary to Government, dated 24th August 1805, to Board of Revenue, directing, that they will make it an object of their particular attention to improve the Revenue derivable from the Tolls levied at Tolley's Nullah; that with the view to the more effectual attainment of that object, the Chief Engineer has been directed to Report the measures he would propose for improving the Navigation of that Nullah. .. .. ..

Ditto, 25th October 1805, No. 3 — No. 40. Letter from Revenue Board, transmitting the Paper marked No. 40 *a*., and recommending a reduction of the duty on Kutcha Goods passing through Tolley's Nullah. .. .. ..

No. 40. *a*. Minute by the Acting President of the Board of Revenue, dated the 16th October 1804, recommending a reduction of the duty on Kutcha Goods passing through Tolley's Nullah. ..

Ditto, 25th October 1804, No. 6. — No. 41. Letter from Secretary to Government, dated 25th October 1804, to Board of Revenue, stating, that the Governor General in

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Council approves of the revised rates of Tolls on Boats passing through Tolley's Nullah. .. ..

No. 42. Letter from Secretary to Government, dated 22nd November 1804, to Revenue Board, directing them to take into their consideration the repairs or excavation which may be required to Tolley's Nullah, and stating that Lieutenant Col. Colebrooke may be able to furnish them with useful information on the above subject—a Survey of that Nullah having been formerly made by that gentleman. .. .. — Revenue Department Consultation, 22nd Nov. 1804, No. 10.

No. 43. Letter from the Revenue Board, dated 4th January 1805, to Government, transmitting the Paper marked No. 43. *a*. .. .. — Ditto 10th January 1805, No. 16.

No. 43. *a*. Letter from Collector of 24-Pergunnahs, dated 22nd December 1804, to Secretary Board of Revenue, stating that Tolley's Nullah should be cleared throughout; that in many places (Ghurriah and Chetlah Hauts) the excavations should be considerable; and that the cost of the whole he Estimates at Rs. 36,200. .. .. — Ditto ditto, No. 17.

No. 44. Letter from Secretary to Government, dated 10th January 1805, to Colonel J. Garstin, stating, that it appearing to the Governor General in Council to be advisable that Government should be furnished with a Report by a professional person on the repairs which Tolley's Nullah may appear to require, Colonel Garstin is therefore directed to furnish the said Report. .. — Ditto ditto, No. 18.

No. 45. Letter from Revenue Board, dated 6th August 1805, to Government, transmitting the Paper marked No. 45. *a*. .. .. — Ditto 15th August 1805, No. 32.

No. 45. *a*. Letter from Acting Collector of Calcutta, dated 30th July 1805, to Secretary to the Board of Revenue, transmitting an Estimate by the Tehsildar, amounting to Rs. 1,271, for the repairs of the Bridges over Tolley's Nullah. .. .. .. — Ditto ditto, No. 33.

No 46. Letter from the Secretary to Government, dated 15th August 1805, to the Chief Engineer, transmitting the Paper marked No. 45. and No. 45. *a*., and directing him to Survey the Bridges over Tolley's Nullah, and to furnish an Estimate for the repairs which may be required. .. .. — Ditto ditto, No. 34.

No 47. Letter from Chief Engineer, dated 18th September 1805, to Secretary to Government, stating, that it is utterly impossible to examine and report on the foundations of any of the Bridges of Tolley's Nullah until the Freshes are out of the River, that within the short space of 30 years, three new Bridges have been built over Tolley's Nullah, and those now standing have, he fears, all failed at the foundations. .. .. — Ditto 19th September 1805, No. 20.

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Revenue Department Consultation, 26th September 1805, No. 14.

No. 48. Letter from Col. John Garstin, Chief Engineer, dated Sep- tember 1805, to Secretary to Government, stating, that in order to determine with accuracy whether it would be adviseable to dig a new Canal in the line laid down in the Plans transmitted, or to cleanse the Old Nullah opened by Major Tolley, he wishes to have correct Survey made of that line on a large scale, and the levels accurately taken... .. ..

Ditto 17th October 1805, No. 3.

No. 49. Resolution passed by Government, on the 12th October 1805, stating, with reference to the Orders issued on the 26th of September 1805, for surveying the line of country delineated in the Map, submitted by Colonel Garstin, with a view to the excavation of a new Canal in lieu of Tolley's Nullah, that Government, on the reconsideration of the subject, considers that the Plan suggested by Colonel Garstin could not be adopted without a heavy expense in the purchase of the ground, and the erection of Bridges, &c.; that exclusive of those considerations, the length of time which would be consumed in making the proposed Cut, and the necessity that would still exist in keeping open the present Nullah, together with other circumstances, appear to form an insurmountable objection to the forming of the Canal proposed by Colonel Garstin; that under the above circumstances, the Government does not think it adviseable to adopt Colonel Garstin's proposition for surveying the line of Country noticed on the Map submitted by him, but directs that immediate measures be adopted for improving the Navigation of the old Nullah, and facilitating the communication between Calcutta through the Channel and the Rivers to the Eastward. ..

Ditto, 21st November 1805, No. 15.

No. 50. Letter from Colonel Garstin, dated 14th November 1805, to Secretary to Government, reporting on the state of the Bridges over Tolley's Nullah. .. ..

Ditto 29th November 1805, No. 4.

No. 51. Letter from Col. J. Garstin, the Superintending Engineer, dated 13th November 1805, to Secretary to Government, transmitting the Paper marked No. 51. *a.* and reporting that he has carefully examined every part of Tolley's Nullah for the purpose of verifying the Survey and Sections taken by Lieut. Col. Colebrooke and Captain Blunt, which appear to be very correct, and form a proper ground whereon to make an Estimate of rendering the Nullah navigable; that he thinks it proper to observe for the information of Government, that the late Major Tolley and his assigns never consulted the interest of the public, or even their own in the management of the above Nullah, though it was to them a source of opulence. The Nullah is excavated upon so contracted a scale, as to be in every respect inadequate to the purposes for which it was made; that a very considerable part of the craft engaged in the Eastern Trade are at all times, but particularly during the dry N. W. season, compelled to go round

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by Chingree and Channel Creeks into the Hooghly, not to avoid the duties, but preferring the long and dangerous Navigation, to the certain and heavy loss constantly sustained by detention in the Nullah, the great chance of destruction or damage to their Boats and property by forcing their way through it, and to the risk of missing their markets, which of course considerably reduces the collections; that under the above circumstances, he is induced to recommend that the improvements to be made to Tolley's Nullah should be executed in the best and most effectual manner possible; that the expense, though a heavy one, should be met, convinced as he is, that it would be the truest economy, as the duties on a greatly increased Trade will amply repay the expense incurred by Government; that it appears to him necessary to deepen the bed of the Nullah throughout, so as to obtain 5 feet of water at Low-water common Tides, and to make the bottom of the breadth of 60 feet, and to form two Basins or Harbours near Tolley Gunge and Gurryah Haut, of 500 yards long, 100 feet wide, and 10 feet deep. ..

No. 51. *a* Estimate of the number of solid feet of soil that must be removed to render the Canal, called Tolley's Nullah, navigable at all seasons for Boats of five hundred Maunds; of the quantity of earth to be taken out to make two Harbours, one near Tolley Gunge, the other near Gurryah Haut; and also of the five large Dams to be made in the bed of the Cut to keep out the Tides; together with an account of the expense that will attend the execution of this work, amounting in all, inclusive of 10 per cent. contingencies, to Rs. 1,75,675. .. .. — Revenue Department Consultation, 29th November 1805, No. 5.

No. 52. Letter from the Secretary to Government, dated 29th November 1805, to Magistrate of 24-Purgunnahs, stating, that it appearing from the Reports furnished by the Board of Revenue, and by Colonel Garstin, that considerable excavations are necessary to improve the Navigation of Tolley's Nullah, the Honorable the Vice President in Council has been pleased to determine that the work shall be immediately performed under the immediate directions of Mr. Blechynden, subject to the general superintendence and control of the Magistrate of the 24-Purgunnahs; the work to be executed partly by convicts, and partly by hired labourers. .. .. — Ditto, ditto, No. 6.

No. 53. Letter from the Secretary to Government, dated 29th November 1805, to the Board of Revenue, stating, that Government having resolved on making such repairs to Tolley's Nullah, as may be necessary for putting it in a good navigable condition, he is directed by the Honorable the Vice President in Council, to transmit Copy of Orders, which have been issued to the Magistrate of the 24-Pergunnahs on that subject. .. .. — Ditto, ditto, No. 7.

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Extract Proceedings of His Excellency the Vice President in Council, in the Public Department, under date 23rd August 1811, marked No. 61. No. 61. a.—and No. 62.		Revenue Department Consultation, 3rd Sept. 1811, No. 8.
No. 61. Letter from H. Stone, Esq. Sub-Treasurer, dated 2nd August 1811, to Secretary to Government, transmitting the Paper marked No. 61. *a.*, and requesting to be informed, whether the Toll is to be paid by him on Boats passing through Tolley's Nullah laden with Treasure belonging to the Honorable Company. ..		Ditto, ditto ditto.
No. 61. *a.* Letter from Collector of 24-Pergunnahs, dated 15th February 1811, to the Sub-Treasurer, transmitting a Bill for Toll on Boats passed through Tolley's Nullah laden with Treasure, and stating, that should the Sub-Treasurer not consider himself authorized to pay the amount, he requests the Sub-Treasurer will be so good as to obtain an order from Government to pass Boats free for the Collector's future guidance, that a similar reference was before made by the Board of Trade, when it was decided, that the Toll should be paid.		Ibid
No. 62. Resolution passed by Government, on the 23rd August 1811, directing that all Boats laden with Goods or Treasure on account of the Honorable Company, passing through Tolley's Nullah, be exempted from the payment of Toll; that the above be recorded in the Revenue Department, and that the necessary instructions be given to the Collector of the 24-Pergunnahs. ..		Ibid.
No. 63. Letter from the Board of Revenue, dated 28th March 1812, to Government, stating, that they are of opinion that little inconvenience is likely to result from levying Toll on Boats laden with property of the Government, and that the exemption is liable to much abuse; that they therefore beg to recommend that the orders of the 20th September last be rescinded, and that the Government Boats be declared liable to the payment of the established Tolls both in Tolley's Nullah and the New Canal.		Ditto, 4th April 1812, No. 7.
No. 64. Letter from the Revenue Board, dated 26th May 1812, to Government, requesting, that instructions may be given to the Magistrate of the 24-Pergunnahs, to furnish a sufficient number of Convicts to remove the obstructions which impede the Navigation of Tolley's Nullah.		Ditto, 15th June 1812, No. 10.
No. 65. Letter from Board of Revenue dated 20th November 1812, to Government, noticing the favorable result the collection of the Tolls on Tolley's Nullah exhibit; and stating that they are persuaded that unless great vigilance had been exercised by the Collector, the collection would have been even less than those of the past year; that they are disposed to recommend a commission be granted to the Collector for the trouble which he must		Ditto, 12th December 1812, No. 1.

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have had in the personal Superintendence of the Tolls, which is absolutely necessary to effect any improvement in this source of Revenue; and that a commission of 5 per cent. on the net amount of the collection has been sanctioned on account of the New Canal. .. ..

Revenue Department Consultation, 19th December, 1812, No. 12.

No. 66. Letter from Board of Revenue, dated 11th December 1812, to Government, stating, that the Farmer of the Ferries in Tolley's Nullah having presented a petition to them, soliciting a remission of Revenue equal to the loss which he has sustained, in consequence of an order of the Acting Magistrate of 24-Pergunnahs, for the discontinuance of the collection of Tolls at certain places enumerated in the Petitioner's Pottah, or that he may relinquish his lease, they beg to recommend that the lease be cancelled, and that they may be authorized to re-let the farm on the best terms procurable. .. ..

Ditto, 13th Feb 1813, No. 10.

No. 67. Let terfrom the Board of Revenue, dated 29th January 1813, Government, stating, that the Collector of 24-Pergunnahs has submitted a tender for the farm of the Ferries on Tolley's Nullah for one year for the sum of 4,500 Rupees; but as the late Farmer has tendered to them proposals for the same amount, they considered it proper to give a preference to him.

Ditto, 20th Sept. 1815, No. 7.

No. 68. Letter from Acting Secretary to Board of Revenue, dated 12th September 1815, to Secretary to Government, acknowledging the receipt of his Letter of the 24th June last, enclosing an extract, Para. 34 and 35, of a letter from the Honorable Court of Directors, and agreeably with the desire of the Honorable Vice-President in Council, furnishes an explanation of the causes of the decrease in the collection of Toll in Tolley's Nullah in the official years 1810 and 1811-12. .. ..

Territorial Department, 5th April 1817, No. 9.

No 69. Letter from Acting Secretary to Board of Revenue, dated 18th March 1817, to Acting Secretary to Government, stating, that the Board recommends that the Collector of Calcutta be permitted to entertain an Establishment at a monthly charge of 61 Rs. for the measurement of certain Lands appertaining to Tolley's Nullah, but usurped by the neighbouring Zemindars.

Ditto ditto, No. 10.

No 70. Order of Government, sanctioning the Establishment required by the Collector of 24-Pergunnahs, for measuring certain Lands pertaining to Tolley's Nullah, the Establishment to cease whenever the work in question shall have been completed. ..

Ditto, 16th Jan 1818, No. 50

No. 71. Letter from Revenue Board, dated 9th January 1818, to Secretary to Government, recommending that the Collector of the 24-Pergunnahs be authorized to disburse a sum of Rupees 1,461 in excavating and clearing the New Canal. .. .. ..

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No. 72. Letter from Secretary to Government, dated 16th January 1818, to the Board of Revenue, stating, that the Acting Collector of 24-Purgunnahs is authorized to disburse the sum of Rupees 1,461, agreeably to the Estimate submitted by him for excavating and clearing the New Canal. .. .. — Territorial Department Consultation, 16th January 1818, No. 51.

No. 73. Letter from Secretary to Board of Revenue, dated 16th February 1819, to Secretary to Government, transmitting the Paper marked No. 73. *a.*, and stating, that the Revenue Board have authorised the disbursement of a sum not exceeding 341 Rupees, for the removal of the obstructions in Tolley's Nullah. — Ditto, 26th February 1819, No. 11.

No. 73. *a.* Letter from Collector of 24-Pergunnahs, dated 12th February 1819, to Secretary to Board of Revenue, transmitting an Estimate for the removal of certain obstructions in Tolley's Nullah. .. .. — Ditto ditto, ditto

No. 74. Letter from Secretary to Board of Revenue, dated 9th December 1819, to Secretary to Government, transmitting the Papers marked No. 74. *a.*, No. 74. *b.*, No. 74. *c.*, relative to obstructions in Tolley's Nullah, and stating, that the Board are disposed to recommend the adoption of the Collector's proposition relative to the Nullah, unless it should be more adviseable to commit the work to a professional Officer. .. .. — Ditto, 11th January 1820, No. 9.

No. 74. *a.* Letter from Collector of 24-Pergunnahs, dated 22nd November 1819, to Secretary to Board of Revenue, stating, that it being very necessary that several parts of Tolley's Nullah, between Pootry Nullah (or Tolley Gunge) and Guriahaut, should be cleaned and excavated, he submits for the approbation of the Board, an Estimate amounting to Rs. 5,447, of the probable expense of the undertaking, and proposes that the work be done by Contract. .. .. — Ditto ditto, No

No. 74. *b.* Letter from Secretary to Board of Revenue, dated 26th November 1819, to the Collector of 24-Pergunnahs, requesting him to state in what manner the Estimate for removing the obstructions has been formed, and whether the individual who framed the Estimate was competent to the undertaking, as the Board are induced to think, that neither the Estimate can be properly formed, nor the work completed, without the aid of professional qualifications. .. .. — Ditto ditto, No

No. 74. *c.* Letter from Collector of 24-Pergunnahs, dated 3rd December 1819, to Secretary to Board of Revenue, stating, that the Estimate of the expense for removing the obstructions in Tolley's Nullah was framed by a Mistry, who was in the employ of Col. Tolley, when the Nullah was first excavated, and who he believes is fully competent to the task. .. .. .. — Ditto ditto, No.

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Territorial Department Consultation, 11th January 1820, No. 10.

No. 75. Resolution passed by Government, dated 11th January 1820, stating, that it appears to the Governor General in Council, that without employing a professional Officer, the due completion of the work to be executed in Tolley's Nullah cannot be secured; that accordingly, Lieutenant J. F. Paton of the Engineers, will be immediately directed to examine the Nullah, and report on the same. .. ..

Ditto, 11th January 1820, No. 11.

No. 76. Letter from the Secretary to Government, dated 11th January 1820, to Lieutenant J. F. Paton, stating, that the Governor General in Council, has this day been pleased to appoint him to examine Tolley's Nullah, and to prepare an Estimate of the expense to be incurred in putting it in a good navigable condition. .. ..

Ditto, 4th February 1820, No. 18.

No. 77. Letter from Lieutenant J. F. Paton, Engineers, dated 29th January 1820, to Secretary to Government, reporting on the state of Tolley's Nullah generally, and transmitting an Estimate of the expense (Rupees 1,98,249,) of putting it in a good navigable condition. .. ..

Ditto ditto, No. 19.

No. 78. Resolution passed by the Government, on the 4th February 1820, stating, that until the obstructions which interrupt the Navigation of the Matabangah and Choorney Rivers are removed or lessened, His Lordship in Council resolves to postpone the adoption of the measures proposed by Lieutenant Paton, as they would necessitate the closing of Tolley's Nullah to the great inconvenience of commerce; that in the mean time preparations might be employed for the execution of Lieutenant Paton's measures, and that he be directed to report, whether the obstructions which at present prevent the Navigation of Tolley's Nullah, might not be removed at an expense of two or three Thousand Rupees. .. ..

Ditto, 14th February 1820, No. 17.

No. 79. Letter from Lieutenant J. F. Paton, Engineers, dated 9th February 1820, to Secretary to Government, with reference to the Resolution of Government of the 4th instant, proposes to postpone excavating Tolley's Nullah till after the rains; but in the meantime, to improve the Navigation in the mode proposed by the Collector of the 24-Pergunnahs. .. .. ..

Ditto ditto, No. 18.

No. 80. Letter from Secretary to Government, dated 14th February 1820, to Lieutenant J. F. Paton, in reply to his Letter of the 9th instant, authorises him to remove the obstructions from Tolley's Nullah, at an expense not exceeding 5,000 Rupees. .. ..

Ditto 7th July 1820, No. 7

No. 81. Letter from Lieutenant J. F. Paton, Engineers, dated 26th May 1820, to Secretary to Government, reporting, that he has cleared Tolley's Nullah, where it had become most obstructed,

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that Boats can now pass freely at common Tides without being detained for the springs, and transmits an account of the expense, amounting to Rupees 4,144, incurred in making several Cuts and Clearances in Tolley's Nullah. .. ..

No. 82. Government Order, directing, that the Paper marked No. 81, be transmitted to the Board of Revenue, with instructions to call upon the Collector of the 24-Pergunnahs, to report his sentiments in respect to the works executed by Lieutenant Paton, in Tolley's Nullah. .. .. — Territorial Department Consultation. 7th July 1830 No. 7.

No. 83. Letter from Board of Revenue, dated 10th November 1820, to Government, transmitting copies of Abstracts and comparative Statements on account of receipts and disbursements of the Tolls of Tolley's Nullah, Balleaghaut, and other Canals. .. — Revenue Department Consultation, 15th Dec. 1820, No. 9.

No. 84. Letter from Acting Secretary to Revenue Board, dated 27th December 1820, to Secretary to Government, transmitting the Paper marked No. 84. *a.* with observations thereon. .. .. .. — Ditto, 13th January 1820, No. 16.

No. 84. *a.* Letter from Collector of 24-Pergunnahs, dated 25th November 1820, to Secretary to Board of Revenue, transmitting a comparative Statement of collections and disbursements on account of Tolley's Nullah and Balleaghaut Canal. .. .. .. — Ditto ditto, No.

No. 85. Letter from Acting Secretary to Board of Revenue, dated 8th December 1820, to Collector of 24-Pergunnahs, remarking on the Paper marked No. 84. *a.* .. .. — Ditto ditto, ditto.

No. 86. Letter from Acting Secretary to Board of Revenue, dated 12th January 1821, to Secretary to Government, transmitting the Papers marked No. 86. *a.* and No. 86. *b.* .. .. .. — Ditto, 2nd February 1821, No. 4.

No. 86. *a.* Letter from Collector of 24-Pergunnahs, dated 21st December 1820, to Secretary to Board of Revenue, stating, that of the sum of Sa. Rs. 1,461, sanctioned for excavating and cleaning the Eastern or Balleaghata Canal, Rs. 650 were only disbursed, and as the Canal is again choaked up at the Eastern and Western Ends, requests the Board's authority to apply the balance of the above sum to remove the obstacles in the Canal. .. ..

No. 86 *b.* Letter from Secretary to Board of Revenue, dated 27th December 1820, to Collector of 24-Pergunnahs, requesting him to submit a detailed Estimate of the probable expense of cleaning and excavating the Balliaghaut Eastern Canal. .. ..

No. 87. Letter from Collector of 24-Pergunnahs, dated 9th January 1821, transmitting an Estimate, amounting to 874 Rs. for excavating the Balliaghaut Canal. .. .. — Ditto ditto, No.

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Extract Proceedings of the Governor General in Council, 7th September 1821, *marked No.* 88. *No.* 88. *a., and No.* 90. .. ..

Territorial Department Consultation, 21st September 1821, No 9.

No. 88. Letter from Superintendent of Police, Lower Province, dated 31st August 1821, to Secretary to Government, transmitting the Paper marked No. 88. *a.*, and stating, that the Ferries mentioned in the 3rd Paragraph of Mr. Barwell's Letter, are not included in the List of Ferries lately proposed to be placed on the Establishment of Public Ferries. .. ..

Ibid.

No. 88. *a.* Letter from the Magistrate of 24-Pergunnahs, dated 27th August 1821, to Superintendent of Police, L. P., stating, with reference to the Ferries over Tolley's Nullah, which hitherto have been under the control of the Collector of the 24-Pergunnahs, that he is not aware that there is any thing to prevent those Ferries being placed under the Magistrate of the Suburbs, unless their being so placed, would disturb the Revenue arrangements connected with Tolley's Nullah. ..

Ibid.

No. 89. Resolution passed by Government on the 7th September 1821, directing that the question relative to the expediency of transferring the Ferries on Tolley's Nullah, from the Collector of 24-Pergunnahs to the Magistrate of the Suburbs of Calcutta, be sent to the Territorial Department, to be there considered.

Ditto, 19th October 1821, No. 9.

No. 90. Letter from the Board of Revenue, dated 28th September 1821, to Government, recommending, with reference to the Order of the 21st instant, on the proposed transfer of the Ferries on Tolley's Nullah, from the Collector of 24-Pergunnahs to the Magistrate of the Suburbs, that the Ferries continue under the Collector. .. ..

Ditto, 8th February 1822, No. 22.

No. 91. Letter from Secretary to the Committee, for reporting on Lieutenant Schalch's Plans, dated 2d February 1822, to Secretary to Government, urging the necessity of clearing Tolley's Nullah, previous to the excavation of the new line of Canals to the Eastward, and suggesting that Lieutenant Schalch be called on to prepare a report of the present state of Tolley's Nullah. ..

Ditto ditto, No. 23.

No. 92. Letter from Secretary to Government, dated 8th February 1822, to Secretary to Committee, for reporting on Lieutenant Schalch's Plans, stating, that Lieutenant Schalch will be instructed to survey and prepare an Estimate for excavating Tolley's Nullah. .. ..

Ditto ditto, No. 24.

No. 93. Letter from Secretary to Government, dated 8th February 1822, to Lieutenant Schalch, directing him to examine and report on the present state of Tolley's Nullah, and prepare an Estimate for clearing the same. .. ..

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No. 94. Letter from the Secretary to the Military Orphan Society, dated 26th April 1822, to Secretary to Government, respecting the falling in of the Bank of Tolley's Nullah between Kidderpore and Allypore, belonging to the Military Orphan Society, and requesting a supply of convicts to repair the Bank. .. .. — Territorial Department, 3rd May 1822, No. 21.

No. 95. Letter from Secretary to Board of Revenue, dated 3rd May 1822, to Secretary to Government, transmitting the Paper marked No. 95. *a.* .. .. — Ditto, 16th May 1822, No 1.

No. 95. *a.* Letter from Collector of 24-Pergunnahs, dated 29th March 1822, to the Secretary to the Board of Revenue, stating, the cause of the decrease of the Collections, realised from Tolley's Nullah, in the year 1820-21, compared with the collection of 1819-20. .. .. — Ditto ditto, No.

No. 96. Letter from Lieutenant Shawe, dated 21st May 1822, to Secretary to Government, stating, with reference to the order of 3rd instant, relative to the excavations made by the water of Tolley's Nullah, on the ground of the Orphan Society, that he estimates the expense for filling up the hollow at Rs. 750, and proposing the erection of a new Bridge at Tolley's Nullah. — Ditto, 23d May 1822, No. 16.

No. 97. Letter from Acting Secretary to Board of Revenue, dated 6th April 1824, to Secretary to Government, transmitting the Paper marked No. 97. *a.*, and commenting on the same. .. — Ditto 30th April 1824, No. 9.

No 97. *a.* Letter from Collector of 24-Pergunnahs, dated 26th March 1824, to the Members of the Board of Revenue, respecting the Board's Orders of the 21st November last, suggesting certain Rules being established to prevent the inconvenient throng of Boats in Tolley's Nullah. .. .. — Ditto ditto, No. 10.

No. 98. Letter from Secretary to Board of Revenue, dated 13th March 1835, to Secretary to Government, Revenue Department, transmitting the Paper marked No. 98. *a.*, and suggesting, that Captain Thomson be instructed to employ the Dredging Steam Engine to deepen the Channel of Tolley's Nullah, under the direction of the Collector of 24-Pergunnahs. .. . .. — Revenue Department Consultation, 19th May 1835, No. 1.

No. 98. *a.* Letter from Collector of 24-Pergunnahs, dated 5th March 1835, to Secretary to Sudder Board of Revenue, requesting the authority of the Board to disburse the sum of 600 Rupees to clear the obstructions in Tolley's Nullah, but suggests, the Superintendent of Canals be directed to undertake the work. .. .. — Ditto ditto, No. 2.

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Revenue Department Consultation, 19th May 1835, No. 3.

No. 99. Letter from Military Board, dated 1st May 1835, to the Governor of Bengal, stating, that the accumulation of earth in certain parts of Tolley's Nullah could be better removed, and at a cheaper rate, by hand-labour, than by Steam Dredger ..

Ditto ditto, No. 4.

No. 100. Letter from Secretary to Government, dated 19th May 1835, to Secretary to Sudder Board of Revenue, stating, that the sum of Rupees 600 is authorized for clearing Tolley's Nullah.

APPENDIX TO APPENDIX (J.)

No. 1.

HONORABLE SIR AND GENTLEMEN,

From the proposals for forming a road from Calcutta to Benares, which I have done myself the honor to submit to the consideration of the Board, I expect no advantage to arise to myself by that undertaking; but my motive therein is purely to recommend myself to the notice of the Company.

Hearing that it is the intention of the Honorable the Governor General in Council to cut a navigable Canal from Balliaghaut to communicate with the Nullah leading to Salmon's Bridge, and to conduct that to the River, I therefore humbly beg leave to offer my services for that purpose. The indulgence of directing that work upon the terms usually granted by the Company to the contractors for excavations in the new Fort, might, by a proper arrangement in the mode and manner of conducting it, and an active conduct, be the means of obtaining some advantage which would enable me with less hazard to myself to execute the former plan. Should the Board be pleased to countenance my application, plans, and sections, which is all that is necessary to ascertain the expence, shall be submitted for their inspection. Or, should the Honorable the Governor General in Council, approve of my undertaking it partly at my own expence, I will engage in consideration of the Company's advancing me Eighty Thousand Rupees, and granting me a Toll for two years on all Boats using that passage to make it navigable for four hundred Maund Boats at all seasons of the year.

Should I be favoured with the execution of these designs, it shall be my most serious endeavour to give the clearest proofs of my wish and inclination to approve myself worthy of the trust.

I am, Honorable Sir and Gentlemen,
With the greatest respect,
Your most obedient and humble Servant,

6th July, 1775. *(Signed)* WILLIAM TOLLEY.

No. 2.

HONORABLE SIR AND GENTLEMEN,

In the last Letter, which I did myself the honor to address to the Honorable the Governor General in Council, relative to the proposition for undertaking the making a Navigation from the Hooghly River by the way of the Nullah at Salmon's Bridge to the Salt Water Lake, and which would open a safe and ready communication with Dacca, Luckipore, and Chittagong—in this I have not only that idea, but I conceive a further advantage—for, was the Nullah, which discharges itself near the powder works, also rendered navigable to Baliagaut,

the Town of Calcutta would be better secured, as it would be on an island, and consequently by a proper disposition, the reduction of it more difficult. I hope, Honorable Sir and Gentlemen, the omitting this in my former letter, and introducing it now, will appear with propriety, especially as it was a strong motive to my submitting that to the consideration of the Honorable Board.

I have the honor to be, with the greatest respect,
Honorable Sir and Gentlemen,
Your most obedient and most humble Servant,

11th July, 1775. *(Signed)* WILLIAM TOLLEY.

No. 3.

MAJOR TOLLEY.

Pub. Cons. Nos. 22 *to* 24 : *September* 11*th*, 1775.

Ordered, that a Survey be made of the line of the road proposed by Major Tolley, together with the lines of the country through which it is to pass, and that Major Tolley be directed to execute the same. The Board approve of the last Plan proposed by Major Tolley for cutting a navigable Canal from Salmon's Bridge to Balliaghaut, but cannot absolutely comply with his proposition until he has made a Survey of the line in which it is to be cut, and reported the same to the Board, with the nature of the Land and the title of the present possessors to it.

No. 4.

HONORABLE SIR AND GENTLEMEN,

In a former Letter, which I did myself the honor to present to the Honorable Board, I proposed an advance of money from the Company to defray the expence for carrying into execution the design of making a Navigation from the Hooghly River to Baliaghaut by the way of the Nullah leading to Salmon's Bridge ; and also to open a passage for Boats to the Salt Water Lake by way of the Nullah near the powder works. Upon maturely considering this, and the strict limitation Parliament have fixed to the appropriation of the sum appointed for works, I therefore apprehend my address to the Honorable the Governor General and Council may not be perfectly coincident with that regulation of Parliament : for which reason, I humbly beg the permission of the Honorable Board to submit to their consideration another proposal on that subject, which is, that I will undertake the completion of this Navigation, exempt of any expence to the Company, and to finish the same in three years, in consideration of a grant of a Toll of one per cent. on the *aurung* invoices of all goods brought by that Navigation. The said Grant to be for twelve years, from the commencement of the work. As the Navigation will not be open for Boats in less than three years, no duty of course will arise, and a heavy expence during that time will attend the work : for these reasons it is humbly requested, that the Honorable the Governor General and Council will be pleased to extend the Grant to that period of time.

I am, Honorable Sir and Gentlemen,
With the greatest respect,
Your most obedient and most humble Servant,

4th September, 1775. *(Signed)* WILLIAM TOLLEY.

No. 5.

Read the following letter from Major Tolley.

HONORABLE SIR AND GENTLEMEN, *Public Consultation, 28th December*, 1775.

In consequence of the commands of the Honorable Board, directing a survey of the line of country through which the intended Channel from the Salt Water Lake to the Hooghly River is proposed to be conducted, accompanying I have the honor to transmit you Plans of the Survey both to the northward and southward of Calcutta, in which the most eligible lines, for that purpose, are laid down with the difference of the level between the Lake and the River.

As a security against damages in the rainy season, it is proposed to raise a high broad dam on each side of the intended Channel, to prevent its overflowing, and also to prevent the circumambient waters on the low grounds from communicating with those of the Channel.

The quantity of ground in the southerly line that will be required, will be about four hundred Beegas, including the banking of the same. The far greater part of which is paddy fields and waste ground. The line does not interfere with any houses, until it comes to Chuckerbere and Bhowanipore, the greater number of which are small mat houses, though it might be carried by the way of Calligaut, and therein have the advantage of not interfering with private property.

The names of the proprietors in the southerly line, with the portion of ground belonging to each that will be effected by the Channel, and the proportional annual rent paid to the Company, are submitted to the consideration of the Honorable Board. The line K, L, M, N, might do, but the line K, L, M, in Plan I, and from M, to the River at Nimbuttah [? Nimtullah] Gaut, in the centre of the Town, is by much the most preferable direction in point of public utility. There is a Road to the River from M, but it is in many places narrow, and on each side it is inhabited; the ground is high, and on that account the expence will be much increased, as also by the purchase of the ground, which in that part of the Town is extremely valuable, and by the additional Bridges that will be requisite. Upon a rough estimate the expence of the execution will be nearly double to what it would be in the first intended line, but as this direction has superior advantages to the public, I humbly beg to offer it to the consideration of the Honorable Board, should the private property in this line render it not practicable. I am, upon the whole, humbly of opinion, after having considered the advantages and disadvantages, the obstacles and favourable circumstances attending each, that this southerly line claims the second consideration in preference to any other line on the North side of Calcutta.

It is most humbly requested, that the Honorable Board will be pleased to admit the exclusive privilege during the term of the Grant, of making navigable communications with the Baliagaut Lake and a moderate Toll over the Bridges, should the Honorable Board resolve in favour of the line K, L, M, the expence of the Bridges will be great, as they should be large, strong, and commodious.

I am, &c.,

November 29th, 1775. *(Signed)* W. TOLLEY.

No. 5. *a.*

Names of the Villages or Districts.	Names of the Inhabitants in the Line of the intended Channel.	Quantity of ground belonging to each. Bgs.	Cts.	Nature of the Cultivation.	Number of Trees on the ground.	Quantity of Garden Ground. Bgs.	Cts.	Number of Houses, specifying the materials with which they are built.	Inclosed with Brick or Mud Walls.	Tenure of the Proprietors.	Proportional Annual Rent paid to the Company by the present Renters. Rs.	As.	P.	Valuation of the Houses, etc. adjudged by Arbitration.	Explanatory Remarks.
Chickerberk.	Dyuhram Sarcar, ..	..	7	..	3	..	..	..	Kuchuh,	Pottah,	1	0	8		
	Hutta Cummar, ..	..	6	..	2	..	..	4 Mat houses,	Mud,	Ditto,	1	10	4		
	Horru Ly, ...	..	6	.	6	..	..	4 Ditto,	Mud,	Ditto,	1	10	4		
	Sauduhnundah Roy, ..	..	13	.	4	..	..		Kuchuh,	Ditto,	1	15	2		
	Ramtonnuh Cherta, ..	..	9	..	..	..	..	..	Mud,	Ditto,	1	5	0		
	Caperam Atchajee, ..	..	5	..	31	..	5	2 Ditto,	..	Ditto,	1	2	0		
	Mutchkeram Cummar,	..	7	..	.	..	..	2 Ditto,	Mud,	Ditto,	1	12	8		
	Gubindee Metre, ..	2	14	..	24	2	14	..	..	Ditto,	8	1	6		
	Saufeleram, ...	..	1	.	..	..	..	..	..	..	0	2	4		
	Sheik Kulleemuddee,	..	6	..	5	..	..	4 Ditto,	..	Ditto,	0	14	4		
	Ramkesur Metre, ..	..	12	..	..	..	..	2 Small kuchuh,	Kuchuh,	.	1	12	8		
	Baunchan Tantee, ..	..	1	.	3	..	..	..	..	..	0	14	4		
	Hurry Dass, ...	..	1	.	1	..	..	..	..	.	0	2	4		
	Gupee Dobah, ..	..	2	..	..	..	..	..	..	.	0	4	8		
	Shaum Laug. ..	..	10	..	10	..	..	..	..	Ditto,	1	0	0		
	Gopal Bussoo, ..	..	1	.	..	..	..	2 Straw kuchuh,	..	Ditto,	0	2	4		
	Kauleesunker Dutt. ..	1	5½	..	..	..	..	2 Kuchuh ditto,	Kuchuh,	Ditto,	3	13	2		
	Durgauram Da, ..	..	4	.	30	..	4	..	Ditto,	Ditto,	0	9	6		
	Banudbund, ...	..	4	..	..	..	..	..	..	Ditto,	0	9	6		
	Baubanneechurn Mookerjee, ..	2	3	..	22	..	..	8 Mat ditto.	..	Ditto,	6	7	2		
	Bulram Mitres, ..	5	17	..	.	..	..	..	..	Ditto,	17	8	8*		
	Emaundee Fukeer, ..	1	3	..	4	1	3	1 Ditto,	Mud,	..	0	0	0†		
	Amount of the proportional Annual Rent, Sicca Rupees.										85	0	8		

* Here the Line of the Channel passes over ground on which are old brick kilns and a small portion of garden. At 380 feet distance, is Bulram Mitres' House.

† From this place to the Lake, the Line of the Channel will for the most part go through paddy feilds and waste ground, as is expressed in the plans.

No. 5½.

Public Cons., dated 28th December, 1775.

Resolved, that the Board do approve of the southern line of Major Tolley's Survey, and agree to his proposal, referring him to the President of the Calcutta Committee of Revenue to settle the purchase of such Houses and Gardens or other lands of private property as are on that line. Agreed, that Major Tolley be authorized to carry into execution his Plan for the Canal, which he has proposed to cut from Balliaghaut to the Callyghaut Nullah, to pass within Surman's Bridge, and in a line with Major Watson's Wall on the north side of it to the River, but this Resolution is not to preclude Major Watson, whenever he or his agents may require it, from having the advantage of the backwater by Flood-gates in sluices, as may be approved by Government, but to be executed at his own expence

Resolved, that a Grant be made to Major Tolley of the Canal for the space of 12 years, agreeable to the terms of his proposal in Consultation 11th September, with an authority to collect a Toll of 1 per cent. on the invoice price of all goods which may be conveyed through that Navigation. Ordered, that the Secretary inform him of the Resolution of the Board, that he may prepare a proper Grant to be executed by Government

(True Copy,)

(Signed) G. A. BUSHBY,

Secretary to the Government of India.

(No. 6. and No. 6. a. omitted.)

No. 7.

Read the following Letter from Major Tolley.

(Enter No. 6.)

Read the Draft of the Grant sent in by Major Tolley with the above Letter.

Pub. Cons 16th January, 1777.

The Board do not agree to allow Major Tolley the extent of 180 yards in breadth, agreeable to the specification contained in his proposed Grant: but resolve—

1st. That he be only allowed such a quantity of ground as may be necessary to form his Canal, including the bed of Surman's Nulla: that the same be described by two parallel lines at the distance of the breadth of the Canal from each other, but that he be allowed no property in the ground which may remain on either side of the banks of the Canal, excepting the right of tracking Boats on one side: that he be not allowed to have any property in any of the Lakes or Nullas which may run into his Canal, nor in any ground which is not above or hereafter specifically granted to him.

2nd. That he be allowed 2,000 Beegas of waste Land (not being private property) if such there be at the place where the Canal shall open into the Baliagaut or Salt Water Lake.

3rd. That no rent shall be demanded or exacted by Government for the same, or of any of the Grants herein mentioned to be made to Major Tolley, but that the whole shall be possessed by him for the space of 12 years rent free, after which period the Grant shall be void, and the sole property thereof devolve again to Government.

4th. That he shall have free and full liberty to widen or improve the Navigation of any Nullas leading into or through the Baliagaut Lake as he shall find expedient or convenient, but that he be not allowed to establish Chowkies or to Collect Duties on the same, and that his right in this respect be confined to the limits of his own Canal, included between the River Hoogly and its junction with the Baliagaut Lake.

5th. That a Table of Rates calculated on the size of the Boats, and the quality of the Merchandize with which they may be loaded, shall be submitted by him to the consideration of the Board, whose approbation shall be necessary to fix the same as the Toll to be collected on all Boats passing through his Canal.

6th. That the exclusive privilege of cutting any new Canal for the communication of the Town of Calcutta with the Baliagaut Lake, which Government shall, during the continuance of this Grant, think it necessary to open, shall, agreeable to Major Tolley's request, be enjoyed by him. The Board understanding always, that any Navigation which may at any time heretofore have been frequented shall not be molested or affected by this resolution.

7th. That he be not allowed to collect any Toll from Passengers, &c. on the Bridges which he may erect over the Canal.

8th. That Government do reserve to itself the right of building any Bridges which it may, at any time hereafter, find expedient to erect over any part of the Canal, provided the same be no expence to him.

9th. That no Lands, which shall be drained by the effects of Major Tolley's Canal, nor any other ground not included in the foregoing conditions, are intended to be granted to him.

No. 8.

Honorable Sir and Gentlemen,

The warm reception you gave to the proposal for opening a Navigation to the eastward, afforded me the greatest pleasure, because on the one hand, it was a singular mark of distinction, as it placed me in a favourable point of view to the Company, and on the other, it entrusted me with the execution of a design of public advantage. On this account, I shall ever be happy, in testifying a grateful acknowledgment, by a strenuous endeavour, with all possible diligence, to merit public approbation.

I have served the Company between thirteen and fourteen years, and in the course of which time, I have not improved my fortune. For this hazardous, difficult, and laborious task, I have been under the necessity of borrowing large sums of money, which are accumulating by the interest. I was not equal to the plan myself, because I was not possessed of a fortune for the undertaking; I was obliged to obtain money at high interest, so that besides the risk of a failure, I have no favourable prospect of any advantage. By the short period of the Grant, the paying off the principal and interest of the borrowed money, I may, under these circumstances, account myself fortunate if I escape with the empty name of projector.

The whole was meant for the Company. It is only to be entrusted to my care to bring it to as great a state of improvement as it will possibly admit of, and in that state, it is to be delivered to them. Admitting some profit to arise, I am well persuaded, Gentlemen, it would

be highly satisfactory to you, to be the means of rewarding an individual by whose labours so valuable an acquisition, in a state of perfection, after a short period, should be delivered to the Company with all its beneficial advantages. Had it been granted in perpetuity, certain limitations would be indispensible, but, as it was meant to revert to the Company, bringing it to as great a state of improvement as possible, would not only enrich that part of the country, through which it passes, but ultimately be an advantage by an increase of Revenue. The fewer restrictions therefore, will stimulate to every possible improvement.

The line of the Canal was at first intended to have been within the compass of five miles, on which my calculation was made. Being obliged to quit that direction, it was found impracticable to proceed in any other line than by the way of Gurriah, which increases the distance at least seven miles. By this I also encounter an absolute necessity of forming a Channel across the Lake to connect the Canal with the Tauder Nulla. In that operation is much labour, expence, and uncertainty of its not being a continual one. Strongly embanking each side of the Channel, will be attended with an immense charge and trouble, and yet it is not clear to me, but that, that method, will in the end be indispensible. The people employed on that work will not only be in water during the time, but they will also be deep in mud. As every part to the eastward will reap a particular benefit from this new intended Channel in the Lake, by having an opportunity of importing goods at any season of the year, a circumstance that never attended them before, they certainly therefore never could be averse to the re-imbursement of an individual, who had undertaken this arduous task, risk, and hazard, and thereby rendered them that convenience.

There is no advantage gained by the bed of the old Nulla, on the contrary, infinite more expence. Draining the water, following the zig-zag direction, and removing the mud from the bottom, far exceeds what would have been incurred in digging solid earth in a right line.

I acknowledge, Gentlemen, I was not sufficiently minute and particular in my proposals, but it arose from an ardent attention to the project, and a most serious wish to the execution. In these my thoughts were wholly absorbed, and not attending to gain. Resting upon a known principle, that public bodies are always generous.

In my plan I proposed completing the Canal in three years, that at the expiration of twelve years it should go to the Company, with all its immunities. It is more than probable, that before I am reimbursed with a suitable return, and at a time, when it is just brought to a state of perfection and profit, it would then be given to the Company, without their having been at any expence to assist the execution of the plan.

If any land should be appropriated on the banks of the Canal for the convenience of the merchants to land their goods, a double advantage would arise to the Company, as they would collect the Duties; and secondly, as the ground would be trebled in its value. It would be of singular use to that part of the country, by the inhabitants having a resource of supply of necessaries from the merchants, without being put to the expence of having them from Calcutta. Should a small advantage arise therefrom, to enable me the better to carry on the work, and as a guard against any accidents, which are inseparable from the project, I conceive such will not be deemed unreasonable. Without some such security, not only my own ruin, but that of my family, may be involved. Even these are only temporary advantages to me, but they are permanent ones to the Company, without expence or risk. There are many persons who would have undertaken the conducting of the design at the expence of the Company, but few at their own. I have every reason to imagine, if it had been carried on, at the Government expence, it would have cost them an incredible sum.

With respect to drained grounds mentioned in the rough draft of the Grant, presented to the Honorable Board, it expresses such ground as has never yielded any revenue to the

Company—making a proviso of that kind, was having an idea towards the improvement of the Company's Lands.

With respect to the Creeks or Nullas communicating with the Canal, the same scheme of improvement was intended:—having a permission of that nature, would, in the end, be advantageous to the Company, as it would constantly keep my mind on the stretch to find out every practicable method of improvement to the Navigation.

To the south part of the Canal, adjoining to the Lake, there is an extensive Jungle, which must be constantly overflowed—the draining of this, if practicable, might be the means of bringing it into a state of cultivation.

From the mouth of the Tauder Nulla, about a day's distance in the Jungle, is an extreme narrow passage or Nulla, named Khontaucautau, which will only admit very small Boats, and if two Boats meet in the Nulla, they cannot possibly pass each other: therefore, in the rough draft of the Grant, I proposed widening that Navigation. On both sides is an almost impenetrable Jungle, which increases the difficulty of the work.

The reason of the making of the Canal was to effect a safe and uninterrupted passage from Dacca, Luckipore, Chittagong, &c. Making the Canal to the Lake, would have been a futile intention, without having had a comprehensive idea to the completion of the Navigation. What is at present imported to Balliaghaut, would not pay the bare interest of the money I shall lay out. By opening the Khontaucautau Nulla, the imports will be considerably increased, and the advantage in this to the Company, will be an addition in the collection of their Duties, even treble what it ever before rendered. The large Boats that come from Dacca, &c., not being able to come through the Khontaucautau Nulla, are under the disagreeable necessity of making their passage, by the large rivers, which is not only attended with much danger, but it is an increased expence in the Navigation. Many people are deterred from coming on account of the danger, which would be removed if the Khontaucautau Nulla was rendered navigable. If it is not rendered navigable, the Canal can be of little use. The design was, that the Navigation should be open the whole year.

As these are thoughts, that have not been suggested by any other person, and undertaken independent of any risk to the Company, I therefore entertain the most flattering idea, that the Honorable Board, will guard me against the probability of suffering a capital loss, and for which reason, the request of establishing a Chokey at the extremity of my work, will not appear improper. As it is a benefit to the public, I therefore hope the request will not be viewed in the light of an injury.

The difference of seven miles, a Channel of two miles across the Lake to the Tauder Nulla—a probability of the necessity of embanking it on each side, being obliged to pursue the bed of the old Nulla, in these the most laborious part of the work is comprehended—it was proposed to be the sole property of the Company; it is undertaken at my own expence, without any hazard to them. If this Channel is effected, a safe and speedy passage is opened to Baukurgunge, Dacca, Luckipore, and Chittagong. Under these circumstances, and under the effort of rendering these advantages to the public, it would be hard that an individual should suffer.

Several Grants have been confirmed by Government, but I believe none with a proviso, that after a certain time, the whole, with its appendages, should be their property.

The Company have little ground on the banks of the Canal to grant. It must be an accommodation with the Ricats, which will be attended with much expence, but if the preservation of the banks are not secured at the first, the Company will likely themselves find it difficult hereafter, as the improved state of the ground, after the Canal is navigable, will likely cause a continual contest in the Court of Judicature if not permanently settled: to avoid which, and remove these obstacles, if the Honorable Board will permit me to become the tenant to the Company, and allow me to pay the revenue of the *Jommabundy*,

agreeable to the *Kisteebundy* of the Rieats, on my rendering satisfaction to them, and letting them remain in their possessions. By this method the Rieat might be under some management, and thereby be the means of securing me from the danger to which I otherwise must inevitably be subject.

Should it appear to the Honorable Board, that there is no reason why the Canal should revert to the Company, as the execution of the design is to be solely at my own expence, and as it is acknowledged to be a public benefit, and also an evident advantage to the Company without possessing it, I therefore humbly hope, that the Honorable Board will be pleased to favor me with the Grant in perpetuity, and in consideration of my widening Khoutaucautau Nulla, to be permitted to have a Chokey, to receive half toll there, and the other half at the mouth of the Canal, adjoining the Hooghly River. To be granted one thousand beegahs of waste land *adjoining to the Tauder Nulla,* and an area of one thousand beegahs of waste land at the *mouth of the* Canal *adjoining to the Lake,* both to be rent free.

And from the above area to be allowed one hundred feet of land on each side of the Canal, and continued to the South of Mr. Francis's garden, provided I can obtain it by fair purchase from the present possessors, and to be granted a Pottah by the Company for the same; such ground included in the above, as belongs to the Company, to be granted clear of expence. From Mr. Francis's Garden to Surman's Bridge, on the south side to be allowed thirty feet, and on the north side one hundred feet, on the same terms and conditions as above.

From Surman's Bridge to the River to be allowed forty feet from the southerly bank of the Canal, and one hundred feet from the northerly bank of the Canal. At the mouth adjoining the Hoogly River, a line extended along the River towards the Fort and to twenty feet, on the north side of the mouth of the Canal, and the same to be formed into an area. To be permitted to have a Gunge for the reception of grain and merchandize, at the mouth of the Canal adjoining the Hooghly River; one at Pooteeree, near the middle of the Canal, another at Tigree, near the Lake, and another on the waste land adjoining the Tauder Nulla. To be allowed all the ground I can clear, not yielding profit to the Farmers or Company; to be allowed the sole privilege of cutting any new Canal: the Company to be allowed to erect bridges over the Canal. No toll to be collected on any bridges built by me. This to be in consideration of my paying after a term of years a certain stipulated sum to the Company. By the length of the grant, and the privileges thereunto annexed, my family may ward off the danger of suffering an injury by my having engaged in such a hazardous undertaking.

I hope, Honorable Sir and Gentlemen, the application will appear so reasonable, that you will be pleased to grant the request, which I ever shall most faithfully acknowledge.

I am, Honorable Sir and Gentlemen,
with the greatest respect,
Your most obedient and most humble Servant,
(Signed) WILLIAM TOLLEY.

No. 9.

SIR

Apprehensive, that as the Honorable Board are not sufficiently acquainted with the necessity of widening the Khontaucautau Nulla, it therefore prevents the execution of the Grant. I request you will be pleased to acquaint the Honorable the Governor General in Council that I beg for the present to recede from the Article which requests the privilege of establishing a Chokey to collect the Toll at the Khontaucautau Nulla, until the necessity of rendering the same navigable, has been investigated,—and that I also humbly request, that the Grant may be executed, omitting that article entirely for the present.

I am, Sir,
Your most obedient humble Servant,
WILLIAM TOLLEY.

March 24th, 1777.

No. 10.

HONORABLE SIR AND GENTLEMEN,

As the principal Hauts and Syahs in the Pauchnungram, the M[illegible]crah, Cospore, Middenmull, and Calcutta Purgunnahs are situated on or near the Banks of the Canal and as I understand the term of the lease expires on the 13th of this month, I beg to submit proposals to the Honorable Board on that subject. As it is the intention of Government to permit me, to have places for the purpose of landing goods it will be a reason for the farmers of those Hauts to be continually disputing, to avoid which and effectually secure the banks of the Canal from being injured by the renters of those Hauts I humbly beg to solicit to rent the Hauts and Syahs in those respective Purgunnahs during the term of the Grant.

I am Honorable Sir and Gentlemen
with the greatest respect,
Your most obedient, and most humble Servant
WILLIAM TOLLEY.

April 11th, 1777.

No. 10½

Remarks.	*Abstract of Major Tolley's proposals for the Grant of his Canal.*
	1st. Major Tolley, in his former plan proposed, that at the expiration of 12 years, the Canal, with all its tenements, should lapse to the Company, but as he thinks that before he can be reimbursed with a suitable return and at a time when it is just brought to perfection it would in that case become the Company's property, without their having been at any expence in the execution of the Plan, he requests the Grant may be made in perpetuity

2nd. By a letter from Major Tolley to the Secretary, dated 24th March, he recedes from the first part of this request till the necessity of rendering the Khontaucautau Nulla navigable, is investigated, and desires this Article may, for the present, be omitted in the Grant

2nd. In consideration of his widening the Khontaucautau Nulla, he solicits permission to establish a Choky, to receive half Toll there and the other half at the mouth of the Canal adjoining the Hoogly River

3rd Consultation 16th January 1777 The Board consent to allow Major Tolley 2000 Beegahs of waste ground for 12 years, not private property, if such there be at the place where the Canal shall open into the Salt Water Lake and Major Tolley has verbally informed the Secretary, that he is content to have the 2000 Beegahs at that Place and not 1000 of those at the Tauder Nulla

3rd. To be granted 1000 Beegahs of waste ground adjoining the Tauder Nulla, and an area of 1000 Beegahs of waste land at the mouth of the Canal adjoining the Lake, both rent free

4th Consultation 16th January The Board consent to make Major Tolley a tenant of such space as it may be necessary to include within the bed of the Canal but do not allow him any property in the ground remaining on either side, except a right of tracking Boats on one side

4th From the above area to be allowed 100 feet of land on each side of the Canal and continued to the South of Mr Francis's gardens, provided he can obtain it by fair purchase from the present possessors, and to receive a pottah from the Company for the same, such Ground as belongs to the Company (included in the above) to be granted clear of expence From Mr Francis's garden to Surman's Bridge on the south side, to be allowed 30 feet, and on the north side 100 feet, on the same conditions From Surman's Bridge to the River, to be allowed 40 feet, from the southerly Bank of the Canal and 100 feet from the northerly Bank, at the mouth adjoining to the Hoogly River a line extended along the River toward the Fort and to twenty feet on the north side of the Canal's mouth and the same to be formed into an area.

5th Major Tolley in his letter to the Board, dated the 11th instant requests permission to rent the Hauts and Syahs in the Pauchaungawn the Maugerah, Cospore, Middenmull and Calcutta Purgunnahs, during the term of the Grant He observes, that the above places being situated on the Banks of the Canal, many disputes with the farmers will be avoided by his renting them, and the Banks of the Canal effectually secured

5th If any land should be appropriated on the banks of the Canal for the convenience of merchants to land their goods a double advantage would arise to the Company from the duties collected and the increased value of the ground, it would also be of singular use to that part of the country by the inhabitants being supplied with necessaries without the expence of bringing them from Calcutta He therefore solicits permission to establish a Gunge for the reception of grain and merchandize at the mouth of the Canal adjoining to the Hoogly River, also one at Potunee [? Pooteeree], near the middle of the Canal, another at Tigree near the Lake

and another on the waste land adjoining to the Tauder Nulla.

6th. To be allowed all the ground he can clear not yielding profit to the Farmers or the Company.

7th. Consultation 16th January. Granted during the term of 12 years, provided any former navigation may not thereby be affected.

7th. To be allowed the sole privilege of cutting any new Canal.

8th, and 9th. Before stipulated and acceded to.

8th. The Company to be allowed to erect Bridges over the new Canal.

9th. No Toll to be collected on any Bridges erected by Mr. Tolley.

10th. The Board informed him, that he should possess the Grant made to him rent free, but I believe he has been advised to pay something in order to make the agreement reciprocally binding.

10th. These to be granted in consideration of his paying after a term of years, a certain stipulated sum to the Company.

11th. He may widen any Nullas, but is confined in, the establishment of Chokies to his own Canal from the Lake to the River.

11th. Widening the Creeks and Nullas, and making them more navigable, would be of great advantage, as boats cannot now pass each other: he hopes therefore that he may be allowed to establish a Chokey on the Kontaucauta Nulla.

No. 11.

1st To this article I am willing to assent, provided the objections which may be made to it by any other Member or Members of the Board, shall not be of such weight as to induce me to change my opinion The reasons which operate in favor of this indulgence are—1st, The hazard and expence which must attend the prosecution of a design hitherto untried in this country, and even in the present advanced progress of it judged by many to be impracticable—2nd, The benefits which the public, and ultimately the Company will derive from its success, even though the Navigation should continue private property—3rd, The means which the nature of the design itself provides of guarding against oppressive impositions, as these will prove a discouragement to the Navigation, and of course ultimately bring a proportionate loss on the proprietor—4th, The claim which every undertaking has to the liberal encouragement of Government, and this, above most others, because if it succeeds the public will reap a certain advantage from it, but if it fails, the loss will fall solely on the projector—5th, The equity of the Toll, whatever the rate of it may be, provided it be now unalterably fixed, since it is optional in those who are to pay it, and no man can complain of being excluded from the participation of what no one now possesses, of what no one can possess, but through the contrivance, labor, expence, and risk of the projector.

If this Article shall be argeed to, it should be stipulated that the rates of the Toll once fixed shall never be exceeded, and a certain proportion of the collections, or a fixed sum in lieu of it, should be paid to the Company.

2nd This is improper, and appears to be unnecessary neither the Board nor Major Tolley himself are yet acquainted with the Navigation of Conta Collee [? Khontaucautau] Nulla, nor of course with the necessity of improving it If it is already navigable and frequented, it will be an injustice to tax the present navigators for any proposed advantages not immediately affecting them, and which they evidently do not want for the purposes of the Navigation of which they are already in possession by long prescriptive right, nor can it be necessary to levy an additional Tax on Boats which navigate Conta Collee Nulla, and which also pass through the Canal, as one Toll will be sufficient for this purpose alone.

3rd Agreed

4th Agreed The last clause to be more fully expressed. Major Tolley's meaning is, that he may be allowed an area at the mouth of the Canal, bounded by four sides of equal length, the first to be set off from Major Watson's wall and continued to 20 feet beyond the north side of the Canal

5th Agreed to allow Major T the right of a Gunge on the area proposed to be granted to him at the mouth of his Canal on the condition that he shall not erect, or suffer to be erected on it any building of masonry or mud walls I do not think any other Gunge can, with propriety, be allowed him as the rights annexed to his Canal, nor are they essential to it

6th Not agreed to

7th 8th and 9th Are already agreed to

10th This is proper if the Grant be made perpetual, but not if for a limited time

11th This is the 2nd Article repeated

(*Signed*) W H

No 11½.

Public Consultation 21st April 1777

Read the following letters from Major Tolley

(*Enter Nos* 15 16 *and* 17)

The above letters having been abstracted into the following Articles in consequence of orders for that purpose, were circulated for the opinion of the Board

(*Enter No* 18)

The following Minutes were returned on the above proposals

(*Enter Nos* 19 20 *and* 21)

The Governor General now delivers in the following Minute

(*Enter No.* 22.)

The Question contained in the above Minute for referring the 1st proposal of Major Tolley to the Honorable the Court of Directors, is put and agreed to

Resolved—1st, That Major Tolley's request to have the possession of his Canal, granted to him in perpetuity, be not complied with, but that this point be referred to the Honorable the Court of Directors.

2nd That he be not allowed to establish a Chokey on the Conta Callee [? Khontaucautau] Nulla, in consideration of his widening that passage The Board judging it not only improper as the necessity of it does not appear, but it could not be granted without injustice to the present navigators

3rd The Board have already agreed to allow Major Tolley two thousand (2,000) Beegahs of waste Land, not being private property, during the term of his grant (if such there be at the entrance of his Canal into the Salt Water Lake) rent free, and this they now confirm.

4th. Agreed, that he be not allowed Pottahs for the Land requested on each side of his Canal excepting for the space of forty feet in breadth on the south side of the Canal, and Major Watson's Wall from Surman's Bridge to the River. But that the Resolution of the 16th January last, "to allow him as much ground as may be necessary to include within the Banks of his Canal, with liberty to track Boats on one side of it."

5th The Board agree to allow Major Tolley an area or square space of ground, comprehended between four equal lines, from Major Watson's Wall along the Banks of the River, towards the Fort, extending to the distance of twenty feet on the north side of the mouth of his Canal, which opens into the River, for the purpose of establishing a Gunge, on condition that he will neither erect nor suffer to be erected, any buildings of masonry or mud upon it, and that he be not allowed a Gunge at any other place.

6th. Agreed, that Major Tolley be not allowed to possess any grounds which he may clear not being specifically included within the foregoing Articles.

7th. Agreed, that the Resolution of the 16th January, respecting the privilege allowed Major Tolley, of cutting any new Canal, be confirmed

8th. Agreed, that the right of erecting Bridges over the Canal be reserved to the Company.

9th. The Board cannot agree to permit Major Tolley to collect any Toll on such Bridges as he may erect

10th As the Board have not agreed to make the Grant of the Canal in perpetuity, it is unnecessary to stipulate any rent to be paid for it to the Company.

Ordered,—That the Secretary notify the above Resolutions to Major Tolley

Resolved,—That the following Letter, be written to the Calcutta Committee of Revenue

(Enter Nos 23 and 24.)

(Nos 12 to 14 omitted.)

No. 14. *a*

THIS INDENTURE made the Fourth day of September in the year of our Lord Christ One Thousand Seven Hundred and Seventy-seven. BETWEEN Warren Hastings Esquire, Governor General of the Presidency of Fort William in Bengal Richard Barwell and Philip Francis Esquires, Members of the Supreme Council of Fort William aforesaid on the part and behalf of the United Company of Merchants of England trading to the East Indies of the one part and William Tolley of Fort William aforesaid Major in the Military service of the said United Company of the other part. WHEREAS the said William Tolley hath made proposals in writing to the said Governor General and Council for the opening a communication from the Salt Water Lake to that part of the River Hooghly hereinafter particularly described by cutting and making a navigable Cut or passage for the purpose at his own proper costs and charges on having a Lease or Grant of the same Cut or Canal for the space of time hereinafter mentioned with such advantages as are hereinafter set forth. AND WHEREAS the said Governor General and Council considering that such a Cut or Canal may be beneficial to the public in general by facilitating the transporting of grain chunam wood salt and other articles of Merchandize to and from the said Lake and parts and places adjacent and to and from the said River Hooghly and other parts have accepted and approved of such proposal and the said William Tolley hath in consequence hereof entered upon the said work and made a considerable progress therein so that the same is absolutely almost completed, and the said

William Tolley is willing and proposes entirely to finish the same as soon as may be. Now THIS INDENTURE WITNESSETH that the said Governor General and Council as well for the considerations aforesaid as for and in consideration of the covenants provisoes and agreements hereinafter named and contained on the part and behalf of the said William Tolley to be maintained kept done and performed have on the part and behalf of the said United Company and as far as they the said Governor General and Council lawfully may and can demised leased sett and to affirm let in and by these presents do (as far as lies in their power) demise lease sett and to affirm let unto the said William Tolley all that the Land or piece or parcel of Land and Soil situate lying and being between the Banks of the said Cut or Canal from the said Salt Water Lake and River Hooghly on and through which the said Canal or Watercourse hath been cut opened and made the same Canal taking its course from that part of the said Lake called Tiggery and passing or running by through or near the villages of Colleghaut Gurreah and Tittlebury in the Pergunnahs Chucklas or Districts of Calcutta Modunmull and Cosspore through Surman's Bridge and from thence falling into the said River Hooghly between the Dockyard commonly called or known by the name of Watson's Dockyard and new Fort William at the distance of forty feet from the wall of the said Dockyard at Kidderpore and also all that other piece or parcel of Land on the south side of the said Canal or Watercourse extending in a parallel line with the northern wall of the said Dockyard of Major Watson's from Surman's Bridge to the mouth of the said Canal or Watercourse being the space of forty feet in width and also all that other piece or parcel of Land on the north side of the mouth of the said Canal or Watercourse near the said River Hooghly forming an area or square one side extending along the Banks of the said River Hooghly towards Fort William aforesaid to the distance of twenty feet on the north side of the mouth of the said Canal or Watercourse with full power priviledge and authority on any part of the said last-mentioned piece or parcel of Land to establish a Gunge Bazar or Market Free Quit and Discharged from the payment of all Rents Revenues Taxes and Demands whatsoever to the said United Company or to them the said Governor General and Council or any person or persons whatsoever. AND ALSO all that piece or parcel of waste Land adjacent to the opening or near the said Canal or Watercourse at the said Salt Water Lake at or near Tiggery aforesaid containing by estimation Two Thousand Beegahs little more or less. AND ALSO all that or such slip or piece or parcel of Land along the side of the said Canal or Watercourse as shall be sufficient for the use of all and every the Boatmen Bargemen and other persons employed in the navigating Boats Barges Budgerows or other vessels on the said Canal or Watercourse to track draw have lead and convey all and every such Boats Barges Budgerows and other vessels to and from the said Lake to the said River Hooghly and to and from all other parts and places situate lying and being on the Banks of the said Canal or Watercourse with full and free liberty power*

they the said Governor General and Council can or may grant the same for him the said William Tolley to take gather receive and collect off and from the Master or Masters Owner or Owners Conductor or Conductors of all and every such Boats Barges Budgerows and other vessels whether the same be laden or unladen passing or going into or from the said Lake and River Hooghly aforesaid and to and from all other parts and places situate lying and being on the Banks of the said Canal or Watercourse such respective Toll or Tolls Rate or Rates Customs Taxes Duties and Impositions as are particularly set forth specified and contained in a certain Book of Rates signed and sealed by the said William Tolley and by him deposited and left with the Secretary of the Public Department with like full power right and permission for the said William Tolley to erect fix make establish and appoint at such different parts and places on the said Canal or Watercourse as shall

* This part of the original is destroyed.

seem to him most convenient and advantageous any and as many Chokee and Chokee Ghaut or Ghauts Wharf or Wharfs Custom Houses for the purpose of taking gathering collecting and receiving all and every such Toll and Tolls Rate and Rates Customs Taxes Duties and Impositions contained in the said Schedule and in case of the refusal or non payment by any such Master or Masters Owner or Owners Conductor or Conductors of all and every such Boats and Barges Budgerows and other vessels of any such Toll or Tolls Rates Customs Taxes Duties and Impositions as shall so become due and payable as aforesaid the said Governor General and Council do as far as in them lies and they lawfully can give and grant to the said William Tolley full power and authority to stop and detain all and every such Boats Barges Budgerows and other Vessels and the same in his custody to keep and detain until such Toll and Tolls Rate and Rates Customs Taxes Duties and Impositions shall be fully paid satisfied and discharged AND FURTHER the said Governor General and Council do hereby give and grant to the said William Tolley full right priviledge power and authority at his own proper costs and priviledges to erect build and make any and so many Bridge and Bridges from side to side over the said Canal or Water-course and at all such place and places thereon as he the said William Tolley shall make choice of for that purpose PROVIDED that no Toll or Tolls Tax or other Impositions whatever shall be collected gathered or received from any person or persons passing the said Bridge or Bridges or for the passage of any Bullock Horses or any Beasts whatsoever or of any Carriage or Carriages but that the passage of all and every such Bridge and Bridges shall be free and undisturbed and uninterrupted PROVIDED always that nothing herein contained shall preclude the said Governor General and Council their Successors or Servants or Agents from erecting building and making at their own proper Cost and Charges any and so many Bridge and Bridges from side to side over the said Canal or Water-course so as not to interrupt or prevent the business of the said William Tolley in the same as the said Governor General and Council or their Successors at any time hereafter may think necessary or proper to erect build or make thereon AND the said Governor General and Council do give and grant unto the said William Tolley full right power and authority to clear dig widen open and enlarge repair and amend all and every such Nullas Brooks Streams Rivulets or Watercourses to and from the said Lake and to and from the said Canal and Watercourse as shall appear to the said William Tolley most convenient and expedient for the improving the navigation thereof; Provided nevertheless that no Toll Tax Custom Duties or Impositions whatsoever shall be taken or levied by the said William Tolley or any other person or persons for any Boats or Vessels whatsoever passing on or through such Nullas Brooks Streams Rivulets or Watercourses on any account or pretence whatsoever save and except as hereinbefore is mentioned TO HAVE AND TO HOLD all and every the said several pieces or parcels of Land hereinbefore mentioned and described and other the premises with the appurtenances and to use exercise and enjoy the liberties powers and authorities afore said (except as before excepted) and under the provisoes and restrictions hereinafter mentioned unto the said William Tolley his Executors Administrators and Assigns from the First day of July now last past for and during and unto the full end and Term of Twelve Years from thence next ensuing and fully to be complete and ended YIELDING AND PAYING therefore yearly and every year for the Rent of the said Land and Premises the yearly Rent or Sum of one Pepper corn if the same shall be lawfully demanded and the said Governor General and Council for and on the part and behalf of the said United Company do covenant promise and agree to and with the said William Tolley his Executors Administrators and Assigns by these presents in manner and form following that is to say that it shall and may be lawful to and for the said William Tolley his Executors Administrators and Assigns from time to time and at all times hereafter during the Term hereby granted to make use of the Premises hereby demised and the several powers priviledges and authorities hereinbefore-mentioned as far as they the

Governor General and Council can authorize and warrant the same. And further that they the said Governor General and Council their Successors and Assigns shall not or will at any time hereafter during the Term hereby granted give grant or demise to any other person or persons whatsoever than the said William Tolley his Executors Administrators and Assigns any like or similar power or authority to Cut and make any Canal or Watercourse from the said Salt Water Lake to the said River Hooghly or parts adjacent thereunto it being the true intent and meaning of these presents and of the parties to the same that no other Cut Stream or Watercourse than that in part made or making by the said William Tolley and the widening opening cleansing or repairing any Nulla or Stream for the effecting and completing the same as hereinbefore is mentioned shall be cut or made in any the same part of the Country during the Term aforesaid and the said William Tolley for himself his Heirs Executors Administrators and Assigns doth covenant promise and agree to and with the said Governor General and Council their Successors and Assigns by these presents that he the said William Tolley his Heirs Executors Administrators and Assigns shall and will at his own proper Costs and Charges finish complete and perfect or cause to be finished completed and perfected on or before the expiration of Three Years to be computed from the time of the said William Tolley's first entering on the said work well and sufficiently open and dig a Canal or Watercourse so as to admit Boats and Vessels of the burthen of four hundred maunds to pass and re-pass to and from the Salt Water Lake to the said River Hooghly and to and from the said River Hooghly to the said Salt Water Lake. And also that he the said William Tolley his Executors Administrators and Assigns shall not nor will erect or build or cause or suffer to be erected or built any Buildings of masonry or mud on any part of the pieces or parcels of Land hereinbefore granted or demised situate lying and being between Surman's Bridge and the River Hooghly on either side of the said Canal or Watercourse. And also that the said William Tolley his Executors Administrators and Assigns shall not nor will on any occasion whatsoever take receive or exact from any Master or Masters Owner or Owners Conductor or Conductors of any such Boats Barges Budgerows or other Vessels as shall pass be drawn or tracked in or through such Canal or Watercourse any further or other greater Toll or Tolls Rate or Rates Tax Duty or Imposition than such as are entered in a Book for that purpose and approved by the said Governor General and Council which Book is Signed and Sealed by the said William Tolley and at the time of the executing of these presents deposited in the Office of the Secretary to the Public Department there to remain during the continuance of the aforesaid Term of twelve* years. And lastly it is hereby covenanted declared and agreed by and between the parties to these presents and the said Governor General and Council for themselves their Successors and Assigns do promise and agree that in case the Honorable the Court of Directors of the said United Company shall at any time during the Term aforesaid signify to the said Governor General and Council or their Successors their approbation to the absolute giving and granting releasing and confirming for ever to the said William Tolley his Executors Administrators or Assigns of all and singular the premises hereinbefore mentioned or any part thereof that then they the said Governor General and Council or their Successors shall and will as far as they lawfully may or can and as soon as conveniently may be after such assent and approbation shall be signified to them by the said Court of Directors at the proper Costs and Charges of the said William Tolley his Executors and Administrators make do and execute or cause to be made done and executed all and every such further and other Act or Acts Deed and Deeds Conveyancers and Assurances in the Law whatsoever for the full and absolute giving granting releasing and confirming of the said premises so directed to be conveyed unto the said William Tolley his

* Note.—Subsequently, an extension of fifteen years of the above lease was granted to Mrs. Tolley. See Paper marked No. 2 in the Table of Contents of this Appendix.—J. M.

Heirs Executors Administrators and Assigns for ever any thing hereinbefore contained to the contrary thereof in any wise notwithstanding. In Witness whereof the Honorable the Governor General and Council of the Presidency of Fort William have hereunto on the part of the said United Company set their hands and the common Seal of the said United Company and the said William Tolley hath also hereunto set his Hand and Seal the day and year first above written.

Sealed and Delivered where no Stamps are in use or to be had in presence of

(*Signed*) WARREN HASTINGS
RICHARD BARWELL
P. FRANCIS

(*Signed*) WILLIAM TOLLEY

J P AURIOL
Secretary

(*Signed*) J P AURIOL
W BRUERE

(*No. 15 to No 17 omitted*)

No 18

Hon'ble Sir and Gentlemen

As the soil adjoining to that part of Colonel Watson's wall near the head of the Canal is of a loose sandy nature and as it may from that circumstance endanger the wall, the removal of a probable consequence that would injure him would be highly satisfactory to me. By altering the course of the Canal about three quarters of a mile above the mouth (at the Hooghly River) and forming a new Channel to open at the distance of a hundred or a hundred and twenty feet to the north of the present mouth would be an effectual means. By this also a reservation of backwater is retained, unconnected with the Canal. The undertaking will be attended with expence but rather than there should remain a possibility of doing an injury, and put it beyond doubt I beg to offer the proposition to the Hon'ble Board for their concurrence to make that alteration and afford me such aid as they may conceive necessary. As the whole cannot be affected before the rains I propose using every endeavour in my power to prevent the encroach of the water on the back of the Canal, opposite the wall of the Dockyard. Should this meet the approbation of the Board, I shall pursue the most speedy method to execute the design.

I am, Hon'ble Sir and Gentlemen
With the greatest respect,
Your most obedient and most humble Servant,
(*Signed*) WILLIAM TOLLEY

Calcutta
9th March 1778

No. 19.

MAJOR TOLLEY

No 12

Public Consultations 30th March 1778

Ordered, that this letter be referred to the Chief Engineer for his opinion, whether such permission can be granted without any inconvenience or injury to the New Fort and that he be desired to acquaint the Board with the reasons on which he grounds his opinion.

No. 19½.

To THE HON'BLE WARREN HASTINGS ESQ

Gov. Genl and Council

GENTLEMEN,

In obedience to your commands of the 30th ultimo, desiring my opinion whether the request of Major Tolley, contained in his Letter of the 9th of March, can be granted without prejudice or inconvenience to the fortifications, with the reasons on which my opinion may be founded, I think it my duty to declare, that the new Cut proposed by that Gentleman will most assuredly be prejudicial to the fortifications, as it would not only completely answer the purpose of a parallel ready made for an enemy in case of a siege, but would also afford them a very secure and commodious place to shelter their Boats, and to land all military stores and provisions necessary for the prosecution of it. The present Excavation of Major Tolley is also admirably well adapted for this purpose, but the proposed new Cut being more advanced, must in consequence be more advantageous to the besiegers as it would shorten the trenches of communication between the Cut and second parallel. this being a matter so very self-evident to me and as I am apprehensive, very detrimental consequences might arise to the Company, should the proposal of Major Tolley be allowed to take place, I cannot refrain from earnestly requesting the Board to take the trouble of examining the present Cut between Surman's Bridge and the River Hooghly, this I do in order to justify myself from the suspicion of an improper bias.

With respect to the inconvenience which might arise from the Cut of Major Tolley, I most solemnly declare, that the very worst effects to the Navigation of the River are to be apprehended should the old Cut be deepened as I understand he proposes, and I do not think it very improbable, but such an additional expence may occasion an entire change in the Channel of the River Hooghly, as the waters of the deep Creeks of the Sunderbund would then constantly precipitate themselves into it without any opposition whatever to impede their course and would also carry with them a considerable quantity of sand and earth

I am, with the greatest respect,

Gentlemen,

Your most obedient and most faithful Servant,

(*Signed*) HENRY WATSON,

Chief Engineer

FORT WILLIAM,
6th April, 1778

(No. 20 to No. 22 omitted.)

No. 23.

(Copy)

To JOHN SHORE, ESQ., *President and Members of the Board of Revenue*

GENTLEMEN

Upon the opening of the Channel through the new Bridge at Kidderpore, there will remain unoccupied a tract of Ground, being the old Course of Tolley's Canal In its present state it will become a receptacle for filth of all kinds to the great annoyance of the Passengers upon so public a Road, to me it may be rendered serviceable as temporary proprie-

tor of the Canal, and if you will be pleased to order one of the Company's Aumeens to ascertain the value of the ground, I will very readily pay the amount upon having a Pottah given to me for it, and I will, at my own expence, undertake to level and keep it in order

I have the honor to be,
Gentlemen,
Your obedient humble Servant,
(*Signed*) J H WILKINSON

CALCUTTA
15th January, 1788

No. 24.

(Copy)

To JOHN SHORE, ESQ., *President,*
and Members of the Board of Revenue

GENTLEMEN

I have been honoured with your Letter of the 4th instant enclosing Copy of a letter from Mr Wilkinson and desiring me to Report, if a compliance with his request will interfere with the Grant to Mr Tolley

I have in consequence surveyed the spot requested by Mr Wilkinson, and perused the Grant to Mr Tolley.

By the latter is conveyed all such slip of land along the side of the Canal as shall be sufficient for the boatmen and other persons navigating Boats Barges, and other Vessels on the Canal to track and convey such vessels to and from the Lake to the River Hooghly in return for which, Mr. Tolley is bound to preserve the Banks or borders on both sides the cut or Canal in such a state that men and cattle may conveniently pass and repass thereon for the purpose of towing or tracking Boats and Vessels and so as to prevent the water of the said Nullah from overflowing the land on either side thereof

If the above conveyance be considered to include both sides of the Nulla I am of opinion, the alienation of the narrow slip which divides the late new cut from the bed of the old Nulla being the southern Bank of the former, would interfere with it, but I must at the same time observe, that from the best information I can obtain, the northern side alone at the part in question has hitherto been used as tracking ground, the southern side being in the possession of Mr. Barwell, and understood to belong to his estate.

By the grant to Mrs Tolley also is conveyed all the land, between the banks of the Cut or Canal, and through which the Canal has been cut or opened, I conceive therefore, that though the course of the Nulla has been altered by Government for the purpose of the new Bridge, the bed of the old Nulla, desired by Mr. Wilkinson, might be claimed by Mrs Tolley in virtue of her Grant

As Mr. Wilkinson's application however, appears to have been made with a view of rendering the spot in question serviceable to him, as temporary proprietor of the Nulla, I beg leave to add my opinion that, he might be allowed to appropriate it temporarily in this capacity, without any infringement of the rights of Mrs. Tolley.

I am, Gentlemen,
Your obedient humble Servant,
(*Signed*) J. H. HARINGTON,
Acting Collector of Calcutta

CALCUTTA
19th April 1788.

(No. 25 omitted)

No. 26.

To THE HONORABLE SIR JOHN SHORE, Bart.,
Governor General in Council.

Hon'ble Sir,

Having understood that Government have lately had under consideration the cutting a new Canal for the purpose of improving the internal Navigation, and facilitating and rendering more safe the commercial intercourse between the Metropolis and those parts of the Company's Provinces lying to the Northward and Eastward of that City, and that the only obstacle to carrying into execution this very important and useful measure, is the Grant of Tolley's Nullah from the Honorable Company, of which nine years yet remain, I beg leave, as the Acting Attorney of Mrs. Tolley, to submit for your consideration a surrender of her interest in that Grant for the unexpired period thereof, on terms that may allow of so beneficial a Plan being carried into effect without loss either to Mrs. Tolley or to the Honorable Company.

The Nullah has been let for these seven years past at a nett yearly rent of Sicca Rupees Fifty-one Thousand and Six Hundred, payable by equal monthly instalments of Sicca Rupees Four thousand Three Hundred, and I beg leave to refer your Honorable Board to the accompanying statement, by which it appears, that the present value of the Nullah to Mrs. Tolley for the unexpired term of nine years from the First of July last, in Company's Paper, at six per cent amounts to the sum of Sicca Rupees Four Lacks, Twelve Thousand, Four Hundred and Ninety five. This sum in six per cent. Paper, or a proportionate amount in eight per cent Paper or cash, would, I conceive, be an equitable compensation to Mrs. Tolley, at the same time that Government, by having the Nullah in their own hands, may prevent any loss to the Honorable Company, and render essential benefit to the public.

On these terms, therefore, I beg leave to tender a surrender of the Grant to the consideration of your Honorable Board, and shall be happy if it meets your approbation.

I have the honor to be, with great respect,
Honorable Sir
Your most obedient and very humble Servant,
WILLIAM JOHNSON,
Attorney of Mrs. Tolley.

August 13th, 1795.

Note. – For the reply to this Letter, see No. 30 of the Table of Contents of this Appendix, and for the reply to No. 30—See No. 31.—J. M.

No. 26. *a.*

Statement of the value of Tolley's Nullah. Nine years of the Grant, from the 1st July last, unexpired.

1st Year's Rent,	4,300 Rupees per month	51,600 0 0	
	8 Years' Interest at 8 per Cent	33,024 0 0	
			84,624 0 0
2nd ditto ditto	ditto, ...	51,600 0 0	
	7 Years' Interest at 8 per Cent, . . .	28,896 0 0	
			80,496 0 0
	Carried over, . .		1,65,120 0 0

	Brought forward,				1,65,120	0	0
3rd Year's Rent,	4,300 Rupees per month,	51,600	0	0			
	6 Years' Interest at 8 per Cent,	24,768	0	0			
					76,368	0	0
4th ditto ditto,	ditto,	51,600	0	0			
	5 Years' Interest at 8 per Cent,	20,640	0	0			
					72,240	0	0
5th ditto ditto,	ditto,	51,600	0	0			
	4 Years' Interest at 8 per Cent	16,512	0	0			
					68,112	0	0
6th ditto ditto	ditto,	51,600	0	0			
	3 Years Interest at 8 per Cent,	12,384	0	0			
					63,984	0	0
7th ditto ditto,	ditto,	51,600	0	0			
	2 Years' Interest at 8 per Cent	8,256	0	0			
					59,856	0	0
8th ditto ditto	ditto,	51,600	0	0			
	1 Years' Interest at 8 per Cent,	4,128	0	0			
					55,728	0	0
9th ditto ditto,	ditto	51,600	0	0	51,600	0	0
				Sa. Rs.	6,13,008	0	0
	To be paid in 6 per Cent Paper Principal				4,12,495	0	0
	Discount 3½ per Cent				14,437	0	0
					3,98,058	0	0
	Nine Years Interest at 6 per Cent				2,14,951	0	0
				Sa. R.	6,13,009	0	0

(No. 27 to No. 31 omitted.)

No. 32.

To THE SECRETARY TO THE BOARD OF REVENUE

SIR,

The Acting Attorney of Mrs Tolley having proposed to the Governor General in Council the surrender of her interest in the Grant of the Nullah, commonly known by the name of Tolley's Nullah, for the remaining Term of that Grant, I have orders from the Governor General in Council to desire the opinion and report of the Board of Revenue, with respect to the amount of the compensation which they think may be reasonably allowed for such surrender if the offer be acceded to, taking into consideration, at the same time the collection of the present Duties on Boats and Merchandize passing through the Nullah and whether any and what remission thereof should be authorized when the grant has been made over to the Company

I am, &c.,
(*Signed*) E. HAY,
Secretary to the Government

COUNCIL CHAMBER
25th September, 1795.

No. 33.

To THE HONORABLE SIR JOHN SHORE, Bart.,

Governor General in Council,

Fort William.

HONORABLE SIR,

We have now the honor to transmit to you a copy of our proceedings regarding the adjustment of the compensation payable to Mrs Tolley for the proposed surrender of her interest in the Nullah, commonly called Tolley's Nullah.

2nd. As a reference to the resolutions recorded on our proceedings of the 11th ultimo, will explain the principles upon which the proposed compensation has been adjusted, as stated in the account prepared by our accomptant and recorded on the 29th of that month, we think it unnecessary to enter into any elucidation of that point, which could only consist of a repetition of the instructions which we issued to our accomptant, we shall therefore only remark, that the amount of the compensation payable to Mrs. Tolley on those principles, is Sicca Rupees 2,98,569.

3. We beg leave to point out to your notice the Letter from Mrs. Tolley's Attorney, which is recorded on our proceedings of this date, and to observe that, should the adjustment of the proposed compensation appear to you otherwise unobjectionable, Mrs. Tolley will be entitled to be reimbursed for such sums as may be expended by her on account of the Charges specified on the Credit side of the Account now transmitted to you.

4. In reply to the instructions contained in the latter part of our Letter, we have only to observe, that no complaints have ever been made to us by any description of persons of the severity of the Duties, except in a few instances when the exaction has exceeded the amount authorized by the Grant; nor adverting to the amount of the whole collection are we disposed to think that there can be grounds for complaint on that head. It appears however from the enclosure in Mr. Johnson's letter of the 8th January last, that in some cases it has been usual to compound with persons liable to pay the Duties, such as fishermen and others, for a sum less than that authorized by the grant, which gives us reason to think that with respect to those the Duty may require modification, but of this we shall be better able to form an accurate opinion when the Duties shall be under the management of the Officers of Government, and we conceive it the less necessary to come immediately to a positive determination upon this point, since the purchase of the surrender of the Grant must be regulated by the existing rights which it conveys.

We have, &c.

REVENUE BOARD, (*Signed*) THOMAS GRAHAM, &c., *Members.*

The 8th April 1796.

No. 33, *a.*

Extracts from the Proceedings of the Board of Revenue.

Read a Letter from the Secretary to the Government, dated the 25th September 1795. Consultation 16th October 1795.

The Board remarking that they are not in possession of any accounts which can enable them to judge of the amount of the compensation that it would be proper to grant to Mrs. Tolley.

Vide Letter to the Governor General in Council, dated the 16th October, 1795.

Agreed, that the following Letter be written to the Governor General in Council.

With respect to the present rate of Duty payable upon Boats agreed, that the Acting President be requested to ascertain whether they in any, and what cases, operate as a burthen upon the public, and particularly upon the mercantile part of the community

Read a Letter from the Sub-Secretary to the Governor General in Council, dated 21st October, 1795

The Board on consideration of the above Letter agree, that a Copy of the Board's address to the Governor General in Council, of the 16th ultimo, be forwarded to Mr Johnson, and that he be informed that as the Governor General in Council has been pleased to desire, that they will confer with him respecting the proposed relinquishment of Mrs. Tolley's interest in the Nullah, they request he will furnish them with the accounts and information therein mentioned

No. 33 *b.*

Consultation 15th January, 1796

Read the following Letter from the Attorney for Mrs A. W Tolley

TO G DOWDESWELL ESQ

Secretary to the Board of Revenue

SIR

I have the honor to acknowledge the receipt of your Letter of the [illegible] November last enclosing a Copy of the Letter addressed by the Board of Revenue to the Governor General in Council on the 16th of the preceding month

It appears by your Letter and the address to the Governor General in Council that to enable the Board of Revenue to form an accurate judgment of the compensation which it would be reasonable to allow Mrs Tolley for the surrender of her interest on the Grant of the Nullah, you should be furnished by me in all practicable cases with an annual detailed account of the Collections, and of the expences incurred in realizing them or in such cases where they are not to be obtained by reason of the Nullah's having been let in farm that I should communicate to the Board through you the terms of the lease upon which the Nullah and Duties had been farmed

I have hitherto delayed replying to your letter in the hope of procuring the detailed accounts required, or at least such an account accompanied by the terms of the lease and a statement of actual collections while under my management as might enable the Board to judge what compensation would be proper to allow Mrs Tolley

The absence of the farmer Mr Pychnch from the settlement, has prevented my obtaining any account of the actual collections for the time it was under his immediate care until the beginning of this month

I have now the honor to enclose to you for the information of the Board, an account of actual Receipts and Disbursements for thirty-nine months commencing with the date of the lease to him and ending in May twelvemonth From May twelvemonth, to the period of my undertaking the management, it was underlet by him to a Native, from whom I have got no accounts I am sorry that this account is not accompanied by a detail of the articles upon which those collections arose, as I have hitherto been unable to obtain such detailed account from the farmer but I hope the two months' actual collections made under my management, will render it necessary [? unnecessary]

It appears by the account of thirty nine months, that the collections average monthly the sum of Sicca Rupees Four Thousand Three Hundred, and seventy-one, four annas, and nine

pie, after deducting all expences of collections; but I should here notice to you, for the information of the Board of Revenue, that this average would have been greater if the compensation tendered by Government for the duties taken off by their order on Gunges had been brought into account, which are on the Gunge authorized by the Grant estimated by the farmer, at about Three Hundred Rupees per month.

The Tolls too, have been much diminished by a Channel of conveyance for Goods from Baliaghaut having been opened, it is said, at the recommendation of Mr. Charles Grant, as a Member of the Board of Trade, inasmuch as the farmer found it absolutely necessary to lower the duty (authorized by the Grant) on piece goods and wood full one-third, in order to reduce them to a rate equal to the extra expence and risk of the land carriage: by the Grant itself it should seem, that this Channel could not be opened or supported but in breach of a covenant therein contained, a considerable loss is reported to me to have been occasioned also by a Cut or Canal made by or under the direction of the Salt Agent at Barrapore, through which, instead of coming through the Nullah as formerly, the salt and other articles of Merchandize of that District, are conveyed to Calcutta.

I have taken the liberty to accompany the farmer's account of collections for thirty-nine months, with the lease from Mrs. Tolley to him, by which the Board of Revenue will be apprized of the Terms on which the Duties have been farmed.

The two months' collections made since the Nullah came under my charge, will exhibit an account which, after deducting the expences added to the farmer's thirty-nine months, will show an average of Sicca Rupees Four Thousand, Three Hundred and twenty-nine, for a period of forty-one months, those collections were all made on Boats and Merchandize: in Boats agreeable to or rather much lower than the authorized rates, particularly on wood and piece goods, so reduced for the reasons above-mentioned. I have accompanied this with a paper explanatory of the Terms under which the sums appear to be collected: I have taken the whole from the different Ghauts at which the Tolls are levied, putting the aggregate sums opposite the names of the Ghauts.

Those two months' collections are not equal to the monthly rent reserved by lease, but is necessary to be observed, that they form part of the unproductive season of the year, and more particularly so of this year, I understand, from the Cossimbazar River, by reason of the great rains, having remained so long navigable for large Boats. However, there can be no doubt, that the excess of the three or four succeeding months will more than make up the deficiency of those past, as there is now no other passage but the Nullah, nor will there be until the setting in of the next rains in June.

I hope the papers I have now the honor to submit through you to the consideration of the Board of Revenue, will be sufficient to direct their judgement on the quantum of compensation to be allowed Mrs. Tolley for the proposed surrender of her interest in the Grant of the Nullah: yet, should any other explanations be requisite that are in my power, I will, on your noticing the points to me, most readily exert myself to obtain them.

I have, &c.,

CALCUTTA:
8th January, 1796.

(*Signed*) WILLIAM JOHNSON,
Attorney for Mrs. A. W. Tolley.

No. 33 c.

				R.	As.	G.	C.
Surman's Bridge.—Toll on Boats of all descriptions except on loaded Wood Boats and Fish Boats,				492	5	13	0
Niabunder.—Reduced Toll on certain descriptions of Boats by agreement,				396	12	5	0
Doolut.—A place for collecting Toll on Boats,				68	15	17	1
Wood Mohol.—The place for collecting Toll on Boats with wood,				[illegible]11	1	1	2
Min Mohol.—Toll on Boats with Fish,				33	6	[illegible]	0
Coot Mohol.—Toll on Boats of all descriptions except on loaded Wood Boats and Fish Boats,				1,6[illegible]	[illegible]	1[illegible]	0
Sicca Rupees				3,4[illegible]		5	[illegible]
Gohona Mohol,	1[illegible]	0	0				
Hattoah,	[illegible]	0	0				
Iolcur,	[illegible]	0	0				
Colly Gunge Ghaut,	[illegible]1	0	0				
Gonnah,	100	0	0				
Keorah Lokarah,	[illegible]0	0	0				
Nuhbud,	1[illegible]	0	0				
Monobdee,	[illegible]	0	0				
Kidderpore Gunge,	54	14	[illegible]				
Neram Gunge,	2[illegible]	[illegible]	10				
R[illegible] Gunge,	24	0	0				
G[illegible] Mohol,	[illegible]	0	[illegible]				
Dongah Mohol,	5	0	0				
				[illegible]0	1[illegible]	[illegible]	0
Total S. R.				[illegible]	[illegible]	[illegible]	[illegible]
Deduct Charges,				[illegible]00	[illegible]	[illegible]	[illegible]
Sicca Rupees				3[illegible]		3	1[illegible]

NOVEMBER 1795.

				Rs.	As.	G.	C.
Surman's Bridge.—Toll on Boats of all description, except on loaded Wood Boats and Fish Boats,				979	12	16	0
Niabunder.—Reduced Toll on certain descriptions of Boats by agreement,				290	2	5	0
Doolut.—A place for collecting Toll on Boats,				98	[illegible]	[illegible]	0
Wood Mohol.—The place to collect Toll on Boats with wood,				1,154	9	5	0
Min Mohol.—Toll on Boats with Fish,				42	11	15	3
Coot Mohol.—Toll on Boats of all descriptions except on loaded Wood Boats and Fish Boats,				1,246	10	12	0
Gohonah Mohol,	15	0	0				
Hattoah,	7	0	0				
Iolcur,	30	0	0				
Colly Gunge Ghaut,	15	0	0				
Carried over, Co's. Rs.	67	0	0	3,811	13	18	3

Brought forward Co's Rs	6[illegible]	0	0	3,811	13	18	3
Gurnah,	100	0	0				
Keorah Pokarah,	50	0	0				
Niabad,	20	0	0				
Monobdee	3	0	0				
Kidderpore Gunge	56	11	15				
Neraun Gunge	2[illegible]	7	10				
Russa Gunge	24	0	0				
Goody Mohol	4	12	0				
				3[illegible]0	1[illegible]		0
Sicca Rupees,				4,162	13	3	3
Deduct Charge				500	0	0	0
Sicca Rupees				3,662	13	3	3

Gohonah Mohol – Is a Toll by composition or agreement taken from a man who has one Boat in the Nullah from whence he carries passengers to certain places down the River, called Woolbarriah. He does not pay as much Toll as is authorized by the Govn.

Hettoonah Mohol – Is a Toll taken on Boats coming into the Nullah but not going through, carrying a variety of articles to sell in different places. The Toll here taken is much lower than the established rates, and is likewise settled by composition or agreement at a certain sum per year.

Jolcur — Is a Toll levied by composition or agreement on Fishing Boats who pass from one part of the Nullah to the other to catch fish. This duty is also less than the established rate.

Colly Gunge and Gurrah — When other Boats are kept on the Nullah for different purposes, in like manner settled by composition.

Keorah Ghaut — A place for collecting Toll for passing small Boats made of one piece of wood.

Niabad – Rent from Tenants on part of 2,000 Beegahs of land being part of the Nullah.

Monobdee —Is a Toll on small Boats that trade in buying and selling wood and carrying it from the mouth of the Nullah to places of delivery either in or without the Nullah, which is also settled by composition.

Kidderpore Gunge —Rents on the Bazar and Tenants.

Neraun Gunge and Russa Gunge — Tenants.

Goody Mohol — A Toll levied on Boats brought into the Nullah, and hauled on the bank in order to be repaired.

The Farmer's Collections, for thirty-nine months	1,70,4[illegible]9
The two months,	7,001
The Collections for forty-one months,	1,7[illegible],[illegible]90

which makes an average of 4,329 Rs. per month.

No. 33. *d.*

WILLIAM JOHNSON, ESQ

SIR

I have the pleasure to send you herewith a Statement of the collections of Tolley's Nullah, during the time it was under my charge, exhibiting the charges and the average monthly, for the same period, which will, I hope, prove satisfactory.

I am &c,

SERAMPORE.
31st December, 1795

(Signed) S PYEFINCH

No. 33. *e.*

An Account of the Collections in Tolley's Nullah, from the 1st March 1791 to the 31st May 1794.

1791	March, Amount of the Duties collected this month,				1985	5	0			
	April, ditto ditto ditto,				4,642	6	3			
	May ditto ditto ditto,				4,083	7	3			
	June, ditto ditto ditto,				3,577	13	3			
	July, ditto ditto ditto				5,632	1	3			
	August, ditto ditto ditto,				5,891	6	6			
	September, ditto ditto ditto				2,107	4	0			
	October, ditto ditto ditto,				3,933	13	3			
	November, ditto ditto ditto				5,568	9	9			
	December, ditto ditto ditto,				5,442	4	0			
1792	January, ditto ditto ditto,				5,210	7	6			
	February ditto ditto ditto,				7,658	13	6			
					57,033	4	0			
	Deduct charges at 300 Rupees per month	3,600	0	0						
	Ditto Rent of Belvidere House at 200 ditto,	2,400	0	0						
	Ditto amount of the collections at Russa Gunge ordered to be refunded by the Board of Revenue	5,704	13	6						
					11,704	13	6			
								45,328	6	6
1792	March, Amount of the Duties collected this month,				7,777	1	0			
	April, ditto ditto ditto,				6,650	5	6			
	May, ditto ditto ditto,				5,224	11	6			
	June, ditto ditto ditto,				4,850	15	6			
	July, ditto ditto ditto,				5,108	4	0			
	August, ditto ditto ditto,				5,103	14	3			
	September, ditto ditto ditto,				4,499	5	9			
	October, ditto ditto ditto,				5,733	2	0			
	November, ditto ditto ditto,				6,832	3	6			
	December, ditto ditto ditto,				4,475	3	6			
1793.	January, ditto ditto ditto,				3,924	9	0			
	February, ditto ditto ditto,				4,993	14	6			
	Carried over, Co's. Rs.				65,176	10	0	45,328	6	6

	Brought forward, Co's Rs		65,176 10 0	45,328 6 6
	Deduct charges at 300 Rupees per month	3,600 0 0		
	Ditto, Rent of Belvidere House, at 250 ditto,	3,000 0 0		
			6,600 0 0	
				58,576 10 0
1793	March, Amount of the Duties collected this month		7,075 10 6	
	April ditto ditto ditto.		4,742 6 6	
	May ditto ditto ditto		4,070 5 3	
	June ditto ditto ditto		3,779 13 3	
	July ditto ditto ditto		4,815 7 0	
	August ditto ditto ditto		4,503 12 3	
	September ditto ditto ditto		3,667 1 6	
	October ditto ditto ditto		4,050 1 0	
	November ditto ditto ditto		1,806 [illegible] 0	
	December ditto ditto ditto		3,61[illegible] [illegible] [illegible]	
1794	January ditto ditto ditto		4,341 [illegible] 3	
	February ditto ditto ditto		[illegible]	
			54,962 4 0	
	Deduct charges at 300 Rupees per month	3,600 0 0		
	Ditto, Rent of Belvidere House, at 250 ditto	3,000 0 0		
			6,600 0 0	
				48,362 4 0
1794	March, Amount of the Duties collected this month		9,687 [illegible] 9	
	April, ditto ditto ditto		5,335 [illegible] [illegible]	
	May ditto ditto ditto		4,849 13 6	
			19,872 [illegible] 6	
	Deduct charges at 300 Rupees per month	900 0 0		
	Ditto, Rent of Belvidere House, at 250 ditto	750 0 0		
			1,650 0 0	
				18,229 [illegible] 6
	Sicca Rupees,			1,70,189 1[illegible] 0

Average per month for 39 months Sicca R. 4,[illegible]71 [illegible]

SERAMPORE, (Signed) [illegible] PYEFINCH

31st December 1794

The [Board] observing that it does not appear either from the Letter or account transmitted by Mr Johnson, that any deduction has been made from the gross receipt of the Nullah on account of the expence of excavating the earth in order to preserve it in a navigable state, or of erecting and repairing Bridges over the Nullah in conformity to the conditions of the Grant.

Ordered, that he be requested to furnish them, with the necessary information, and accounts regarding those articles of expenditure which they conclude must have been unavoidably incurred from time to time since the commencement of the Grant

No. 33. *f.*

Consultation 11th March, 1796.

Read the following Letter and Enclosure from the Attorney for Mrs. Tolley.

To GEORGE DOWDESWELL, ESQ.,
Secretary to the Board of Revenue.

SIR,

In reply to your Letter under date the 19th ultimo, requiring me to furnish for the information of the Board of Revenue any deduction that has been made from the gross receipts of the Nullah either for excavations, in order to preserve it in a navigable state, or for erecting and repairing Bridges in conformity to the grant. I beg leave to state, that by the Lease to the Farmer now with you, Mrs. Tolley received the sum of Sicca Rupees Four Thousand and Three Hundred nett per month, all charges for excavations and repairs being required by that lease to be made by the Farmer without any expence to Mrs. Tolley.

In consequence thereof, I applied to the late Farmer for an account of any such disbursements not included in the statement accompanying my letter of the 8th ultimo, he has transmitted to me an account, blended with his mercantile concerns, and his own house expences, from which I have made the accompanying extract of the sums which appear to have been expended for repairs, or in excavations

The late Bridge at Belvidere was, I believe, built prior to the commencement of his Lease, and the expences of the present Bridge I had not got at the time of writing my last letter. The accompanying Extract was so unsatisfactory, that for the better information of the Board, I have obtained from Mr. J. Lindsay, the person who built the present Bridge at Belvidere, an estimate of the probable expence for keeping the three Bridges in repair for eight years, which he states as follows: Sicca Rupees One Thousand for present repairs to Surman's Bridge, and Five Hundred for the Bridge at Russapuglah, and allowing that in eight years the Bridge at Kidderpore might possibly fall, he allows the sum of Six Thousand Sicca Rupees for re-building it of timber, which is about Eight Hundred Rupees more than he has charged me for erecting the Bridge at Belvidere. From the enquiries I have been able to make, and from an actual investigation which I had set on foot prior to my last address, to ascertain in case of the proposed surrender to the Company being accepted, what excavations would be necessary in order to deliver up the Nullah in proper repair agreeable to the conditions of the Grant, it appears that the necessary excavations will cost about Two Thousand Sicca Rupees, and to keep the Nullah navigable for Boats, agreeable to the Grant, it will cost about Five Hundred Rupees a year.

The accounts required will stand as follows:—

For present repairs, ...	1,500
Allowance for a new Bridge, ...	6,000
For present excavations, ...	2,000
Yearly for the remainder of the Term at 500 per Annum, ...	4,000
Total, ...	13,500

I have burnt a quantity of Bricks for the proposed present Repairs which are now going on, and will be completed in the course of ten days.

I have, &c.,
(Signed) W. JOHNSON,
Attorney for Mrs. A. M. Tolley.

CALCUTTA:
February 9th, 1796.

No. 33. *g*.

		Rs.	As.	P.	Rs.	As.	P.
March	Kishno Mistry to remove the ruins of Bridge opposite Burgh and Barbers,	6	0	0			
	Cooley hire	0	1	6			
					6	1	6
April	Advanced for cleaning the Jungle at the end of the Nullah,	15	0	0			
	1 Seer 12 Chuttacks of nails for Russa Gunge Bridge,	0	11	6			
					15	11	6
May	Making and railing at Russapugly Bridge, 24 Goruns,	0	8	0			
	Carpenters' Work,	2	0	0			
					2	8	0
June	Piling the Drain opposite the Chokey at Surman's Bridge, Firewood Maunds 125	12	15	0			
	5 Baskets for ditto	0	15	0			
	Carpenters' work	1	1	0			
	Jute 3 Seers	0	2	6			
	Cudjuns 19	6	[illegible]	0			
	Tendalls 12	2	0	0			
					23	3	[illegible]
1791							
July	Removing wood out of the Nullah,				1	0	9
August	ditto ditto				1	7	0
September	Coolies taking wood out of the water at the Wood Mohol				1	12	0
October	Paid Roghonauth Mistry for repairing Russapugly Bridge	4	0	0			
	Coolies removing wood out of the Nullah,	1	7	0			
					5	7	0
November	Coolies taking wood out of the Nullah at the Wood Mohol	2	1	0			
	Repairing to Russapugly Bridge,	2	3	3			
					4	1	3
December	Coolies removing wood out of the Nullah,	1	3	0			
	Carpenters Coolies removing a Boat sunk in the Nullah,	1	10	0			
					2	13	0
1792							
January	Coolies removing wood,				0	8	0
	Charges for excavating the Nullah, 14 Codalies	10	0	0			
	100 Baskets	7	8	0			
	Advanced for Coolies,	15	0	0			
					32	8	0
1792							
February	Coolies removing wood out of the Nullah,	0	15	6			
	Coolies excavating the Nullah,	6	8	0			
					7	7	6
March	Cooley hire at the Wood Mohol,	0	4	0			
	Coolies removing stumps of trees out of the Nullah,	6	1	6			
					6	5	6
	Carried over, Co.'s Rs				111	1	6

	Brought forward, Co's. Rs	.. ..	111 1 6
April	Removing wood out of the Nullah,	0 10 0	
	Repairing Russa Gunge Bridge	7 14 6	
			8 8 6
May.	Advanced Tolsaram Doffadar, levelling the ground at the new Bridge, ..		35 0 0
June	Paid Tolsaram Doffadar in full for removing earth	90 0 0	
	Codalies, Baskets, and Mats	6 9 0	
			96 9 0
July	22 Coolies working at Russapugly Bridge		1 13 0
November	Charges at the old Bridge,		7 5 0
1793			
March.	Advanced for Coolies and Mats for excavating the Nullah,		18 0 0
	Advanced for Coolies,	165 0 0	
	50 Codalies Mds 2 9-3	34 9 0	
	Bamboos, Mats, &c	0 9 6	
			[illegible] 6
1794			
July	Repairing Russapugly Bridge		11 0
December	Stopping the mouth of the Nullah at Conrah Pota		7 0 0
	Sicca Rupees		[illegible]

Consultation 11th March, 1796

The Board having considered the above Letter and Enclosures, are not aware that there are any objections to the data assumed by Mr Johnson for Estimating the Compensation payable to Mrs. Tolley for the surrender of her interest in the Nullah, that is to say, that of taking the average of the nett collections for forty one months amounting to Sicca Rupees 4,[illegible] per mensem, as specified in the account recorded on the Board's proceedings of the 10th January last. From the amount however resulting from a calculation made upon that principle it is to be observed, that the amount of the expences for repairing old and building new Bridges and making the necessary excavations in the Nullah is to be deducted as proposed in Mr Johnson's letter above recorded, and that with a view to an accurate adjustment of the Interest Account it is essential to determine in what manner such deductions should be made, that is to say, in one gross sum or by deductions from the stated periodical receipts of the Nullah. On inspection of the items composing the account of the expences in question it appears that they are of three descriptions, viz.:

1st	Expences immediately required for the repair of the present Bridge	1,[illegible]00
	Ditto making new excavations required,	[illegible],000
2nd	Ditto for yearly excavations at 500 per annum	4,000
3rd	For building a new Bridge, ..	6,000

On the foregoing review of the question it would appear, that the items composing the first mentioned article (supposing the money to be disbursed, within six months from the commencement of the ensuing year of the case) should be deducted from the estimated receipts of that period, that the expences on account of the annual repairs and excavations should be deducted from the amount of the annual receipts, and that the expence allowed for building a new Bridge, as it is impossible to specify the period when such disbursement will be required, should be deducted when half of the remaining from the commencement of the ensuing year or first July next.

The Board likewise remark, that as Mrs. Tolley will be entitled in the adjustment of the above account to credit for interest on the estimated nett monthly produce of the Nullah

in like manner Government will be entitled to credit an account of interest for eight years on the sum which may appear to be payable to Mrs. Tolley, as an equivalent for the advantages relinquished by her, supposing the amount to be immediately issued from Treasury. Resolved therefore, that the above observations be communicated to the accomptant, with directions to submit to the Board a Statement of the compensation payable to Mrs. Tolley, adjusted on the principle above stated, reckoning from the commencement of the ensuing year of the case or 1st July next, to the expiration of the Grant, being a period of eight years.

No. 33. *h.*

Read the following Letter and Enclosure from the Accountant to the Board of Revenue. Consultation 29th March, 1796

To WILLIAM COWPER, ESQ.,
President and Members of the Board of Revenue

GENTLEMEN,

I have the honor to lay before you, in obedience to your directions of the 11th instant, an account of the compensation payable to Mrs. Tolley for the surrender of her interest in the Nullah commonly called Tolley's Nullah, adjusted upon the principle laid down in your Resolutions transmitted to me.

The several Original Papers, transmitted with your directions, I have the honor to return.

I have, &c.,

(*Signed*) R. W. COX,
Accountant, Board of Revenue

FORT WILLIAM,
ACCOUNTANT GENERAL'S OFFICE:
The 22nd March, 1796.

No. 33. *i*.

Dr. ... *Account of the Compensation payable for the Farm of Tolley's Nullah, for 8 years, formed on an Estimate of the probable Receipts and Charges.* ... **Cr.**

	Rs.	As.	G.	C.
To Receipts for 96 months, at 4,329 per month.	4,15,584	0	0	0
To compound interest at 8 per cent. per annum. computed on the Receipts of each month to 1st July 1804.	1,57,219	0	0	0
	5,72,803	0	0	0

By Charges.	Rs.	As.	G.	C.	Rs.	As.	G.	C.
Immediate Repairs, &c.	3,500	0	0	0				
New Bridge at the expiration of 4 years.	6,000	0	0	0				
Yearly 500.	4,000	0	0	0				
					13,500	0	0	0
By compound interest on 3,500. for 8 years, at 8 per cent. per annum, ...	2,978	0	0	0				
Ditto ditto on 6000, for 4 ditto, at ditto.	2,163	0	0	0				
Ditto ditto on the annual payment of 500, supposing the sum to be disbursed in the middle of each year.	1,531	0	0	0				
Ditto ditto on 2,98,569, (being the compensation which appears to be payable to Mrs. Tolley by this account) for 8 years, at 8 per cent. per annum. ..	2,54,062	0	0	0				
					2,74,234	0	0	0
Ditto Balance on amount of the compensation payable to Mrs. Tolley on 1st July 1796.					2,98,569	0	0	0
					5,72,803	0	0	0

E. E.

(Signed) R. W. COX,
Accountant, Board of Revenue.

Fort William
Accountant General's Office
The 22nd March, 1796

The above Letter and Enclosure having been sent in circulation on the 25th instant, the following Resolution was passed upon them.

The Board being of opinion, on consideration of the above letter and enclosure, that it is advisable previously to submitting them to the consideration of the Governor General in Council, that the necessary measures should be taken to obviate any objections hereafter on the part of Mrs. Tolley's agents to the manner in which the account of the compensation has been adjusted,—Resolved, that a copy of the account enclosed in the above letter, together with a copy of the Board's Resolutions of the 11th instant, which are descriptive of the principles upon which it has been made out, be forwarded to Mr. Johnson, for any observations which he may have to make upon it.

No. 33. *j.*

Read the following Letter to Mr. William Johnson, Attorney for Mrs. Tolley. Consultation 5th April, 1796.

To G. DOWDESWELL, ESQ.,
Secretary to the Board of Revenue.

SIR,

I have to acknowledge the receipt of your favour, under date the 25th ultimo, covering a Copy of the account of the compensation, and have no objection or observation to make on the principles of that account, as it coincides with what I had conceived to be the fair mode of calculation.

As I have been making the repairs, I shall probably finish the excavations that are necessary, agreeable to the terms of the Grant, before the 1st of July, the period proposed for the surrender, those sums will of course in that case be taken out of the account prepared by the Accountant to the Board of Revenue.

I have, &c.,
(Signed) W. JOHNSON,
Attorney for Mrs. A. M. Tolley.

CALCUTTA:
The 4th April, 1796.

Revenue Board.
True Extract.
(Signed) G. DOWDESWELL,
Secretary

No. 35. *a.*

(Copy)

I beg leave to submit for the information of the Board, the following statement of the collections made at Tolley's Nullah during the past year, abstracted from the detailed accounts laid before me by Seeroo Ghose, who has acted in the capacity of Superintendent on the part of the late Proprietress, for these last ten years, and who, during that period, has, I understand, executed the trust much to the satisfaction of his employers, and as far as I Consultation 6th July, 1804. The Acting President's Minute.

have been able to ascertain from enquiries, equally to the satisfaction of Merchants and Traders availing themselves of that navigation.

Names of the Ghauts at which the Tolls are collected.	*Amount of Annual Collection at each Ghaut.*				REMARKS.
	Rs.	As.	G.	C.	
Surman's Bridge, ..	13,586	10	9	0	Arising from the Established Tolls.
Caut Mahl, ...	5,758	4	3	0	Ditto ditto, Boats loaded with firewood
Coot Mahl and Russapuglah, ...	15,879	12	0	0	Arising from the Established Tolls on Boats and Merchandize entering from the Eastward.
Niabunder, ...	3,148	7	6	0	Established by Mr. Wilkinson, for making the collections from Merchants' Boats with whom a composition of Tolls had been settled.
Colley Gunge, ...	125	0	0	0	Ditto.
Gurreah, .. Basdoney, Keora Pockerea, .. Teora, .. (Ferries)	1,701	0	0	0	These places let in Farm. With an exception to Jolkur, which is a rent paid by Fishermen for the privilege of fishing in the Nullah, the collections arise principally from the hire paid by passengers crossing at Ferries at different places of the Nullah.
Jolkur, ...	275	0	0	0	
Hattoo Mahl, ..	61	0	0	0	
Narrain Gunge, ..	155	0	0	0	Arising from the rents paid by the Tenantry residing on the ground at the mouth of the Nullah, near the Cooley Bazar
Gohona Mahl, ..	119	0	0	0	Paid by a person who keeps passage Boats to carry passengers to Woolbareea and other places down the River, for which he has permission to enter the Nullah, and ply everywhere along the Banks for passengers.
Russa Gunge ..	180	0	0	0*	
Total, ..	40,989	2	6	0	

The sum allowed monthly to Seeroo Ghose for establishments, was 500 Sicca Rs., of which 300 was considered as appropriable to himself and Native establishments under him, and 200 to Europeans.

The places at which the Tolls have been collected have been unnecessarily multiplied. They ought to be limited to two, one at each end of the navigation, viz., Surman's Bridge. To collect the Toll on Boats entering from the River Hooghly, and Coot Ghaut or Russapuglah to collect the Toll on Boats coming from the Eastward. The Ghauts denominated Caut Mahl, Niabunder and Colley Gunge, should be discontinued, as being attended with more inconvenience than accommodation to the Merchants.

The Ghauts or Ferries at Gurreah, Basdoney, Keora Pockerea, and Teora, may continue in farm as at present.

The Ghaut called *Hattoo Mahl* is a duty collected on small Dungahs carrying articles for sale to the different Hauts and Bazars lying in the neighbourhood of the Banks of the Nullah. This Mahl ought to be abolished.

Narrain Gunge.—The collections under this head being unexceptionable, may remain so long as the ground is occupied by Tenants as at present.

Gohona Mohl.—As the money paid by the person holding this Mahl gives him the free navigation of the Nullah for his passage Boats employed as described in the column of remarks, it appears a moderate compensation for the exercise of that privilege, and as it is optional with passengers to use these Boats or to embark on the numerous Boats of other

* Paid by resident Ryots. The land on which the Gunge stands is the property of the Zemindars of the 24-Pergunnahs, to whom the heirs of the late Colonel Tolley pay rent.

individuals employed on the Ganges for the same purpose, there appears no objection to its continuance.

Russah Gunge.—This appears to be entirely a private concern, and cannot be estimated upon as a resource from the Nullah. The rent paid annually to the Proprietors of the land is Twenty Rupees.

The separate paper No. 1 contains the present authorized rates of Toll on which I beg leave to offer the following recommendations for the Board's consideration.

The duty on Treasure should be entirely abolished.

One per cent. on all Goods and Merchandize.
One Rupee per mille on Treasure.

The one per cent. on all Goods and Merchandize has been found a burthensome charge on commerce. Merchants who would willingly (had the Toll been moderate) have availed themselves of the navigation of the Nullah, have brought their Boats by Ballee Ghaut, and transported their goods by land to Calcutta, a distance of upwards of three miles. The risk and inconvenience to which their goods were thereby exposed is obvious, but the saving of charge was of consequence, being found on comparison to be equal to about eighty-five Rupees in the Hundred, consequently almost all Boats loaded with valuable merchandize have resorted in latter years to Ballee Ghaut, to the great detriment of the collections of the Nullah. But I understand from enquiry amongst the Merchants that if the rate of Toll were moderate, they would prefer bringing their commerce from the eastward through the Nullah, in particular in the rains, as they would avoid the injuries to which their goods are liable from exposure to weather and other accidents in being transported by land from Ballee Ghaut.

Instead therefore of taking 1 per cent. on the value of the commerce, I would recommend a Toll in lieu thereof be taken on the burthen of the Boats at the rate of Two Rupees per 100 maunds, as now fixed on Boats loaded with straw and other bulky articles, the remaining rates to continue as at present until it shall be ascertained from experience and further enquiry, whether any or what modification of them would be advisable.

The Nullah has not undergone any general repair or excavation for many years, both are much wanted at various places, from Surman's Bridge to the eastern entrance of the Nullah, about four miles beyond Russapuglah, comprehending a distance of nearly 12 miles.

Previous, however, to any such work being undertaken, the Nullah should be surveyed by a professional person, to ascertain with exactness the places requiring to be excavated, and to form an estimate of the expence.

I beg leave to propose to the Board, that the information now laid before them, be submitted to His Excellency in Council, with such recommendation as may appear to them proper regarding the suggestions on the abolition of certain Ghauts and collections, modifications of the rates of Tolls—and that until the receipt of his orders thereon, the collections from the Nullah, which from the 5th instant belongs to Government, to be entrusted to the aforesaid Native Superintendent Seeroo Ghose, to be made agreeably to the existing rates of Toll until further orders.

Extract of a Minute from the Acting President of the Board of Revenue, dated 6th July, 1801.

That Seeroo Ghose act under the orders of the Collector of the 24-Pergunnahs, and that he be allowed the following establishment.

Teseeldar's Cutcherry.

Seeroo Ghose per month,	125	0	0
1 Mohurrur,	10	0	0
1 Podar,	6	0	0
1 Bill Sirkar,	7	0	0
Carried over,	148	0	0

Brought forward	118	0	0			
3 Peons, 1 at five, and 2 at four each .	13	0	0			
1 Carpenter per month and which provides for petty repairs to the Bridges of Allypore and Russapuglah, .	9	0	0			
1 Vakeel to attend the Collector's Cutcherry,.. ..	10	0	0			
Stationery, ...	4	0	0			
				184	0	0
Surman's Bridge						
1 Darogah, ...	20	0	0			
2 Mohurrurs at eight each, . .	16	0	0			
3 Peons, 1 at five and 2 at four each,	13	0	0			
1 Podar, ...	[illegible]	0	0			
Stationery, .	[illegible]	0	0			
				[illegible]	0	0
Russapuglah						
1 Darogah, ...	20	0	0			
2 Mohurrurs	16	0	0			
1 Podar, ...	[illegible]	0	0			
1 Weighman for ascertaining the Tonnage of the Boats	[illegible]	0	0			
2 Manjees to assist, ...	6	0	0			
3 Peons, ...	13	0	0			
Stationery .. .	4	0	0			
				68	0	0
Total, Sicca Rupees, .				[illegible]	0	0

In addition to this monthly sum, a contingent charge may be incurred for the temporary employment of an European at one or other of the Ghauts when this becomes necessary the Tehseelder will acquaint the Collector of the 24-Pergunnahs and obtain his [illegible] for employing one. When the final arrangements are made, I would recommend that an European be permanently fixed at the two Ghauts.

The Collector of the 24-Pergunnahs will take from Secroo Ghose the customary security.

I shall hereafter submit to the Board's consideration the account which I have obtained of the lands appertaining to the Nullah, and which revert to the Company.

The 6th July 1804. *(Signed)* THOMAS GRAHAM.

No. 40. *a.*

(Copy.)

With a view to enable the Board, without further delay, to report finally to His Excellency in Council, on the representation of the firewood Merchants, which came enclosed in the Letter from the Secretary to Government, in the Revenue and Judicial Department, under date the 23rd August last, and also to the Representation from the Bioparies of Tolley Gunge, which came enclosed in the Secretary's Letter of the 27th ultimo, I sent for the Tehseeldar of the Nullah, and having inspected his accounts and collections whilst acting for the former Proprietress of the Nullah, I have ascertained as follows:—

1st. That from the firewood Merchants in general, he levied only One Rupee on each hundred maunds of firewood instead of Two Rupees on each hundred maunds *burthen*

of the Boats, as authorized in the grant of the Nullah from Government to Major Tolley. That it frequently, nay indeed almost constantly occurred, that Boats of three, four, or five hundred maunds *burthen* did not load above one half or two-thirds of the quantity of firewood they were capable of carrying, which explains the assertion of the Merchants having paid only at the rate of Sicca Rupees 3-8 for Boats of five hundred Maunds *burthen* The Boats in general being their own property, they found it more advantageous for their traffick to take in small cargoes, and make expeditious trips than to embark a full lading, and thereby engross more time to make two trips than is occupied in making three. It being an article commanding almost an immediate sale, the returns were quick, and the last of the three trip was carried on from the profits arising out of the two first cargoes.

In ascertaining the above point, I necessarily went into an examination of the cost and charges attending the Trade in question, and from the result I am enabled to say, that in the mode it is at present conducted by the Merchants, the rate of Two Rupees per hundred maunds now levied on the tonnage of the Boats falls so heavy on their traffick as not to leave a profit sufficient to encourage them in the pursuit of it I am therefore induced to suggest to the Board, that it be recommended to Government to fix the Toll in future on Boats importing firewood at One Rupee per hundred maunds *burthen* of the Boat, instead of Two Rupees per hundred maunds as now levied. This, I am satisfied, the Merchants can well afford to pay from their profits, which are very handsome, amounting upon a calculation for the year, taking the present selling price of firewood as the data, to about cent per cent

2nd With respect to the representation of the Bioparies of Tolley Gunge, I find by an examination of the accounts of the late Proprietress of the Nullah, that their Statement of the rates of their former payments of Toll is correct. I entered into a similar enquiry into the profits on their Trade as into the firewood traffick, to ascertain whether the Toll of Two Rupees per hundred maunds upon the *burthen* of the Boats fell heavy upon the commerce they dealt in which they denominate *Cutcha Goods* or otherwise, and have satisfied myself as in the case of the firewood, that the continuance of the rate of Two Rupees per hundred maunds on the *burthen* of the Boat would operate as a discouragement to that species of traffick, and which consisting chiefly in the necessaries of life in common consumption amongst the native community I beg leave to suggest that it be recommended to His Excellency in Council, that the rate of Toll on Boats laden with *Cutcha Goods* be fixed in future at One Rupee on each hundred maunds *burthen* of the Boat instead of Two Rupees per hundred maunds as levied at present To prevent any misapprehension with respect to the commerce coming under the above general denomination of *Cutcha Goods*, a detailed list of the articles may be published at the same time the proposed reduction of rates of Toll (if approved by His Excellency in Council) are notified for general information.

That all Boats laden with *Pucka Goods*, or the more valuable articles of commerce, continue to pay Two Rupees on each hundred maunds burthen of the Boat as at present fixed

That the rates of Toll on Budgerows, empty Boats, &c. remain the same as already fixed.

I have made enquiry into the Merchants' complaint of the hardship they were subjected to in being obliged to navigate their empty Boats, intending to export to the eastward, all the way from Tolley Gunge to Kidderpore Bridge, a distance of four miles, merely to pay the Toll on their empty Boats and find that it was an internal arrangement introduced by the former holders of the Nullah to preserve distinct the accounts and collections made on loaded and empty Boats. As there appeared to me that no good purpose either public or private could be answered by a continuation of this practice, as the sums paid on the different accounts could easily be entered under their proper heads, wherever received, I have taken upon myself to instruct the Tehseeldar to discontinue the practice, and to receive the Duties or Toll on the empty Boats at the same Ghaut they may export by.

In regard to what the merchants state on the score of paying double duty when obliged to disembark their goods from large Boats and to transport them on smaller Boats through the Nullah, the case is briefly thus, the small Boats on entering the Nullah pay the customary duty levied on empty Boats and the proprietor of the large Boat is held responsible for the Toll according to the established rate on the burthen of his Boat—no further Toll is levied on the small Boats when loaded with the Merchant's goods. It might be left optional with the Merchant, either to pay on the burthen of their large Boats, which cannot pass through the Nullah, or pay on the burthen of the smaller Boats on which they may import their cargoes.

(Signed) I GRAHAM

No. 51.

To GEORGE DOWDESWELL, ESQ.

Secretary to Government, Revenue Department.

SIR,

In obedience to the Orders of Government in the month of February last, I carefully examined every part of the Canal commonly called Tolley's Nullah for the express purpose of verifying the Survey and Sections taken by Lieutenant Colonel Colebrooke and Captain Blunt, which appear to have been done with great accuracy, and form a proper ground whereon to make an estimate of the expence of rendering it navigable.

In March I was ordered to proceed on Service to the Field, and since my return the floods in the Nullah have, until this time, prevented my completing the necessary remarks.

It is proper for the information of Government to observe that the late Major Tolley and his Assigns never consulted the interest of the public, or even their own, in the management of this business, though it was to them a source of opulence. It is executed upon so very contracted a scale as to be in every respect inadequate to the purpose for which it was made. A very considerable part of the Craft engaged in the Eastern Trade are at all times, but particularly during the dry North wester season compelled to go round by Chingree and Channel Creeks, into the Hoogly, not to avoid the duties, but preferring the long and dangerous navigation to the certain and heavy loss constantly sustained by detention in the Nullah, the great chance of destruction, or at least of damage to their boats and property, by forcing their way through it, and to the risk of missing their markets, which of course must considerably reduce the collections.

Some idea may be formed of the great difficulty of passing from Calcutta to the deep waters of the Sunderbunds from the circumstance of my being in a small Budgerow four days getting through the Nullah, although I was assisted by numbers of the Collector's peons, and all the Chokeydars stationed on its Banks, who were directed to attend me, and was favoured by the highest spring-tides of the full-moon in February when they rise nearly as much as at any season of the year. The Canal was so crowded with Boats, whose crews striving and fighting to get on during the short period of the springs, which alone afforded sufficient water, obstructed each other and defeated their own purpose. Five Boats that in different parts of the Cut had grounded and burst, either from the weight of their lading, or from being destroyed by the worm, choaked up the Channel, and many of the mangeys made bitter complaints of being ruined, having, they said, been detained all the former springs, and no hopes of being able to get through during those of the present moon.

From this statement it appears that a Regulation is required, which ought to be rigidly and impartially enforced. To compel all Boats navigating the Nullah to keep on the right

hand side going from Calcutta, and on the left coming out of the Sunderbunds, or *vice versâ*, such an order would greatly facilitate the passage to all parties And a small establishment might be provided to remove sunken Boats without loss of time

Major Tolley's Agents cleaned out the Canal in 1797, at an expence of about thirty-six thousand Rupees, this was money nearly thrown away: the next season the obstructions were as bad as ever it not having been sufficiently deepened, or widened in any part, when the trifling bunds they had thrown up, were taken away.

Lieutenant Colonel Colebrooke's proposal does not go much further, for there is a wide difference between rendering it passable, and affording such proper accommodation to the Trade, as shall induce them to give it a decided preference; there can be no doubt, but that if the difficulties of the passage are removed, all Boats from the eastward, and from the upper country, will, during the dry season, prefer this passage It is not surprising that people who suffered severely whilst these Collections were in private hands, should avoid the Nullah—when once they are assured of the obstacles being removed, their own interest will cause them again to frequent it.

For these reasons I am induced to recommend, that this important work should be executed in the best and most effectual manner possible That the expence, though a heavy one should be met convinced that it will be the truest economy, and it is evidently far more prudent to widen and deepen it properly, so as to afford ample room, rather than to have the work to do over again in the course of a few years. It is to be expected, that when completed upon a liberal scale, the Duties, on a greatly increased Trade, will amply repay the expence incurred by Government.

It appears to me to be necessary to deepen the bed of this Canal throughout, so as if possible to obtain five feet water at low water common Tides, which will barely leave four feet at the springs, a depth only equal to the draught of a Five Hundred Maund Boat, moderately loaded, also to make the bottom, generally speaking, of the breadth of sixty feet: the natural slope of the earth will then render the cut every where of a proper width at the top

Note—In several places it is at present considerably wider.

And as a further and important relief, to prevent the accumulation of Boats, so as to obstruct the passage, I propose, that Two Basins or Harbours,* near Tolley Gunge and Goory Haut, dug, each five hundred yards long, one hundred feet wide, and ten feet deep be made with narrow passages of only thirty-two feet broad at each end The Bridge near Tolley Gunge serves for one: thus by damming up the waters, the Tides will be impelled through these Harbours with sufficient force to prevent their filling up with silt, as has always been the case in several attempts made by the former proprietors

* Note—These it is believed were never made—J M

Should Government think proper to direct the execution of this work, as much labour must be performed in a very short space of time, it will require a person of abilities and experience, whose exertions can be depended upon, to superintend it

I have the honor, to transmit a copy of the Survey of the Nullah made by Lieut Colonel Colebrooke and Captain Blunt, with the Sections, to show where and how it is to be deepened, and also a detailed Estimate of the expence that probably will be incurred in the execution of the work, which, although not rigidly accurate, is as much so as the nature of the subject will admit.

I have the honor to be,

Sir,

Your most obedient humble Servant

JOHN GARSTIN, *Lieut. Colonel of Engineers*

FORT WILLIAM:
13th November, 1805.

No. 51. *a.*

Estimate of the Number of solid feet of soil that must be removed to render the Canal, called Tolley's Nullah, navigable at all seasons, for Boats of Five Hundred Maunds; of the Quantity of earth to be taken out to make Two Harbours, one near Tolley Gunge the second near Gooryhaut, and also of the five large Dams to be made in the bed of the Cut, to keep out the Tides; together with an account of the Expence that will attend the execution of this Work.

	Yards.	Length in feet.	Solid contents in feet.
Distance from the River Mouth to Section A, ...	625	1,875	
Ditto ,, A.......... to ...... B, ...	700	2,100	
Ditto ,, B.......... to .... C, ...	1,440	4,320	
Ditto ,, C.......... to ..... D, ...	450	1,350	
Ditto ,, D.......... to .... E, ...	1,475	4,425	
Ditto ,, E.......... to .... F, ...	980	2,940	
Ditto ,, F.......... to .... G, ...	1,085	3,255	
Ditto ,, G.......... to .... H, ...	860	2,580	
Ditto ,, H.......... to .... I, ...	2,375	7,125	
Ditto ,, I.......... to .... K, ...	2,080	6,240	
Ditto ,, K.......... to .... L, ...	2,300	6,900	
Ditto ,, L.......... to .... M, ...	3,150	9,450	
Ditto ,, M.......... to .... N, ...	2,530	7,590	
Ditto ,, N.......... to .... O, ...	1,700	5,100	
Ditto ,, O.......... to .... P, ...	1,650	4,950	
Ditto ,, P to the deep waters of the Sunderbunds, ...	600	1,800	
	24,000	72,000	

Running feet.	Miles.	Furlongs.	Poles.	Feet.
72,000	13	5	21	3½ length to be deepened.

	Length in feet.		*Breadth.*		*Depth.*		Solid contents in feet.
Channel, ...	72,000	×	60	×	5	....	21,600,000
2 Harbours, each.....	1,500	×	100	×	10	....	3,000,000

Allow one man can remove 32 solid feet per day, it will require for 24,600,000 ÷ 32 = 7,68,750 men.

Labourers.		No. of days.		No. of men each day.		Month.		Rupees.					
7,68,750	÷	200	=	3,843	×	7	×	3	80,703	0	0			
Add 10 per cent. Overseers,									8,070	0	0			

Pay for removing the Earth, ..				88,773	0	0
15,000 Codalleys, at 1 rupee each, ..	15,000	0	0			
150,000 Baskets, Rattan, at 8 Rupees per 100, ..	12,000	0	0			
Rods, Pickets, Levels and other Tools, ..	600	0	0			
				27,600	0	0
WATER WORK.						
1,000 Men for 200 days, 7 months, at 4 Rupees each, ..	28,000	0	0			
10 Pairs of double forcing Pumps, at 400 ditto, ..	4,000	0	0			
10 China Pumps, at 300 ditto, ..	3,000	0	0			
10,000 Baskets, &c. to throw water, at 25 per 100, ..	2,500	0	0			
				37,500	0	0
Carried over, ..				1,53,873	0	0

BUNDS							Brought forward, ..	1,53,873	0	0
No of Bunds	Feet	Breadth	Depth	Solid feet	No of Mds to 1 foot	Mds of blue clay				
5	× 90	× 36	× 12	= 194,400	× 2	= 388,800.				

388,800 Maunds of Clay, at 1 Rupee per 100 Mds.	3,888	0	0			
Labour in making the Bunds, .	1,944	0	0			
				5,832	0	0
Total Sicca Rupees				1,59,705	0	0

FORT WILLIAM
13th November, 1805.

JOHN GARSTIN
Lieut Col of Engineers

N B —It is always customary in works of this sort to add 10 per cent for Contingencies — 15,970 0 0

Grand Total, Sicca Rupees, — 1,75,675 0 0

(Signed) J G

No. 52.

TO THE MAGISTRATE OF THE 24-PERGUNNAHS

Revenue Department

SIR

29th November, 1805

It appearing from Reports furnished by the Board of Revenue and by the Officer in charge of the Engineer Department, that considerable excavations are necessary in order to improve the navigation of the Canal, commonly known by the name of Tolley's Nullah, I am directed to acquaint you, that the Honorable the Vice-President in Council has been pleased to determine that the work shall be performed under the immediate directions of Mr. Blechynden, subject to your general superintendence and controul.

2. The Vice-President in Council understanding, that with a view to the completion of the work before the commencement of the ensuing rains, it is essential that it should be begun without loss of time, you are desired to instruct Mr. Blechynden to commence the work as soon after the receipt of the present orders of Government as may be practicable.

3 The work is to be performed partly by Convicts and partly by hired Labourers; with the view, however, of reducing the expence of the latter as much as possible, you are desired to employ as large a body of Convicts in excavating the Nullah as circumstances may admit. You will accordingly order such of the Convicts as are not at present engaged in the execution of any particular work to be immediately employed in the Nullah, you will likewise withdraw the Convicts at present employed at Barrackpore Cantonments and at Baloo Gunge for the same purpose

4 You will likewise employ in the same manner the Convicts at present engaged in repairing the Road to Dum-Dum, as soon as their labour shall be no longer required on that Road.

5. The number of Convicts in the grounds at Barrackpore is to be reduced to 150 men and the remainder are to be employed in the Nullah.

6. In addition to the above-mentioned Convicts, the Nizamut Adawlut will be desired to order five hundred more Convicts to be sent to the Presidency, from some of the Districts adjacent to Calcutta, for the purpose of assisting in the excavation of the Nullah.

7. In addition to the Convicts, you will engage such a number of Labourers as shall appear to you, after consulting with Mr. Blechynden, to be necessary for the due execution of the work in question.

8. On receipt of the present orders, you will direct Mr. Blechynden to prepare a general Estimate of the expence required for making the necessary repairs to the Nullah, which you will submit to Government, with any remarks which may occur to you on the subject.

9. A reference will be made to the Military Department for the purpose of obtaining the services of four Sergeants, to be employed under Mr. Blechynden in Superintending the labour of the workmen, who may be employed in excavating the Nullah.

10. Mr. Blechynden will be allowed to draw an extra salary of 300 Rupees per month, for his services in superintending the execution of the above-mentioned work, in lieu of all other personal charges.

11. The work now proposed to be undertaken, being of considerable importance, both with respect to the convenience of the community and the Public Revenue, which may hereafter be derived from the Tolls levied on Boats passing through the Nullah, the Vice-President in Council doubts not that you will give every attention in your power to the execution of the work, so as to render it as beneficial to the public and to Government as possible.

12. A considerable pecuniary sacrifice being likewise required for the purpose of putting the Nullah in a good navigable condition, the Vice-President in Council is satisfied that both yourself and Mr. Blechynden will be sensible of the propriety of giving the strictest attention to economy in the pay of the workmen, in the purchase of implements for making the excavations, and generally in whatever other disbursements may be necessary for the execution of the work in question.

13. I am directed to transmit to you the enclosed plan of a Survey made of the Nullah, which the Vice-President in Council concludes will be of service in the execution of the work above ordered.

G. DOWDESWELL,
Secretary.

No. 55.

To GEORGE DOWDESWELL, ESQ.,
Secretary to Government.

Sir,

I have the honor to acknowledge your Letter of the 29th ultimo, concerning the repairs proposed to be made to the Eastern Canal, and request you will do me the favor to inform the Hon'ble the Vice-President in Council, that it will be my endeavour to merit the approbation of Government by giving the strictest attention to the instructions I have received.

I beg leave to transmit Mr. Blechynden's estimate and reply for the information of Government.

As it will be necessary to disburse a considerable sum in the purchase of implements and for other expences, to enable the convicts to commence on the above work without delay, I request you will obtain the orders of Government, that I may be furnished with an advance on account from the Treasury of the Collector of the 24-Pergunnahs, amounting to the sum of Sicca Rupees Five Thousand.

I am Sir,
Your most obedient Servant,
E. THOROTON,
Magistrate.

Zillah 24-Pergunnahs,
Fouzdarry Adawlut:
The 6th December, 1805.

No. 55 a

Estimate of Deepening and enlarging Tolley's Nullah

Digging 23,555¾ Upper Daurs, at 14 As	20,611	1	0			
Ditto, 34,469$\frac{1}{7}$ Lower ditto, at 1-8 „	51,703	10	0			
				72,314	11	0
4,000 Codalies,				4,000	0	0
30,000 Baskets,				3,000	0	0
Pickets, Levels, and small Tools				500	0	0
Bunds,				1,000	0	0
10 China Pumps, at 300				3,000	0	0
1,200 Sweepers				300	0	0
Pumping at 20 Rs. 100 running feet of Nullah,				14,400	0	0
				98,514	11	0
5 per cent. Contingencies				4,925	12	0
				Sa. 1,03,440	7	0
Sicca Rs.				[illegible]	3	6

Rich. BLECHYNDEN

No. 57

To GEORGE DOWDESWELL, ESQ.
Secretary to Government

Sir,

To prevent individuals obstructing the repairs of the Eastern Canal by claiming ground on the banks of it the property of Government, I beg leave to suggest the expediency of an order being issued to the Collector of the 24-Purgunnahs to depute the proper Officer to assist Mr. Blechynden in marking out the course of the Canal.

I am, Sir,
Your most obedient Servant,
E. THOROTON,
Magistrate.

Zillah 24 Pergunnahs,
Fouzdarry Adawlut,
The 13th December 1805.

No. 58

To THE BOARD OF REVENUE.

Revenue Department, Bengal &c.

Gentlemen,

19th December 1805.

I am directed to transmit to you the enclosed Copy of a Letter from the Officiating Magistrate of the 24-Pergunnahs, and to acquaint you, that the Hon'ble the Vice President in Council desires, that you will instruct the Collector of that District to depute an Officer with the necessary documents to point out to Mr. Blechynden, the ground which has reverted, together with the Canal commonly called Tolley's Nullah, to Government, or which may otherwise be public property.

2. On the 29th ultimo, you were desired to take into your consideration, the expediency of either reducing or abolishing the establishment hitherto maintained for collecting the Tolls levied on Boats passing through the Canal. It appearing to Government, that the establishment cannot now be required for any public purpose, the Vice-President in Council has been pleased to direct, that the establishment be abolished from the expiration of the present month.

I have, &c.,
G. DOWDESWELL,
Secretary.

No. 59.

To GEORGE DOWDESWELL, ESQ.,
Secretary to Government.

SIR,

A further advance of Sicca Rupees 10,000 being requisite on account of the repairs of the Canal, I request you will obtain the sanction of the Honorable the Governor General in Council, for the payment of that sum from the Treasury of the Collector.

The total amount received for the repairs of the Canal is Sicca Rupees 50,000, of which sum 48,500 has been advanced to Mr. Blechynden, and the remainder (1,500 Rupees) expended in constructing ten Jails, capable of containing 2,000 convicts, with separate Guard Houses, &c. for the accommodation of the Sepoys and Burkundauzes.

I beg leave to offer the following observations in explanation of the difference between the actual disbursements and the estimated expence for the performance of this important work.

First.—With a view to the completion of the work before the commencement of the ensuing rains, the Honorable the Vice-President in Council was pleased to direct, that Mr. Blechynden should be instructed to prepare a general estimate of the expence required for making the necessary repairs, and to commence the work without loss of time.

To avoid the delay of surveying the Canal then filled with water, Mr. Blechynden prepared his estimate from the sections of the plan of survey, transmitted with your letter of the 29th November, supposing them to be correct and sufficient for the purpose; but in several instances these sections have proved erroneous, and the quantity of excavation considerably exceeds the computed number of cubic feet. The difference may also be attributed to a sufficient number of sections not having been taken originally. There appearing only 15 sections in the whole distance, which exceeds thirteen miles, whereas Mr. Blechynden found it necessary to take 43 sections between Gurrya and the eastern extent of the Canal, a distance of about six miles.

Secondly.—The unfavourable weather in the months of January and February greatly increased the expence and labour of baling the water out of the Canal, and securing the Bunds.

Thirdly.—The soil in many places being entirely quicksand, has caused much embarrassment and additional labour in the digging.

Fourthly.—The convicts have been found inadequate to the work they were expected to perform, consequently the saving in this respect does not correspond with Mr. Blechynden's statement, from which it would appear, that the total expence, (viz. 1,03,440 Sicca Rupees, exclusive of the necessary expence of superintendence) might be reduced to one-half by the labour of the convicts.

This disappointment is to be in some degree attributed to the natural unwillingness of the convicts, but it arises in a great measure from the necessity of keeping them constantly in fetters, and the extreme heat of the weather which has occasioned several casualties.

Having personally inspected the progress of the work, I can confidently assert, that Mr. Blechynden has spared no exertion in executing the orders of Government, but as the extra digging will be considerable, and much difficulty may occur hereafter in surveying the works actually performed, I respectfully solicit that an Officer of the Engineer Corps may be deputed to verify Mr. Blechynden's sections, and report generally on the present state of the Canal

I am, &c.,
(Signed) E. THOROTON,
Magistrate

ZILLAH 24-PERGUNNAHS,
FOUZDARRY ADAWLUT
The 5th May 1806

No. 60.

The Governor General in Council, on a consideration of the foregoing letter, is pleased to authorize the Magistrate of the 24-Pergunnahs to draw for the further sum of Rupees 10,000 on account of the repairs of the Eastern Canal.

Resolved,—That an Officer of the Corps of Engineers be deputed to inspect the repairs made to the Nullah, as suggested in the last paragraph of the Magistrate's letter, and to report his sentiments on the subject to Government.

Ordered,—That an Extract from the Proceedings be recorded in the Military Department, that the necessary orders respecting the proposed survey may be thence issued

(Signed) G. DOWDESWELL,
Secretary to Government, Revenue Department

No. 68.

To W B BAYLEY ESQ
Secretary to Government, in the Revenue Department

Miscellaneous

SIR

I am directed to acknowledge the receipt of your Letter of the 24th June last, enclosing an extract (paragraphs 34 and 35) of a Letter from the Honorable the Court of Directors, and communicating the desire of the Honorable the Vice-President in Council, that the Board supply a direct explanation of the causes of the decrease of the collections on account of the Toll levied on Boats on their transit through Tolley's Nullah in the official years 1810-11 and 1811-12; and in conformity with those instructions I am directed to request, that you will submit for the consideration of Government and the information of the Honorable Court of Directors, the following summary of the proceedings of the Board on the subject.

2. On the 13th of September 1811, the Board had under their consideration the accounts of the collections on account of the Toll in question for the official year 1810-11, and observing a net decrease of Rupees 7,017, The Collector of the 24-Pergunnahs was called upon to explain the cause of the defalcation; the Collector's explanation was considered by the Board satis-

factoy; he stated that "the decrease of Revenue was occasioned by the Muttabanga Nullah "being open all the year, which allowed Boats to pass through instead of coming round "by the Sunderbunds, as they used to do." The Collector represented in the same Letter, that "there would be a further decrease in the accounts of the present year (1811-12) owing "to the exemption given to Boats laden with Goods, Treasure, &c. belonging to the Company."

3. On the 28th of May 1812, the Collector again solicited the attention of the Board to the decrease occasioned by the more convenient passage which had lately been afforded by opening the communication between the Ganges and Hoogly Rivers, through the Muttabanga Nullah, and suggested the expediency of establishing a Toll on Boats passing through that Channel; this suggestion, after the acquirement of further information on the subject was submitted to Government on the 17th of July 1812, and at the same time the correspondence relative to the defalcation in the Revenue derived from Tolley's Nullah was furnished for the information of Government: and it ultimately produced the promulgation of Regulation IV. of 1813.

4. In submitting to Government the accounts of the collections for the year 1811-12, the Board offered the following remark in their address of the 23rd of October 1812. "The "decrease in the amount of the collections from Tolley's Nullah is satisfactorily accounted "for by the Collector, in a letter under date the 28th of May last, which was submitted by us "to your Lordship in Council; it appears to have arisen from the facility which has lately been "afforded for the passage of Boats through the Muttabanga Channel," and this explanation (to which might have been added another cause assigned on the former occasion, viz. the discontinuance of the practice of levying Tolls upon Boats conveying public property) the Governor General in Council was pleased to consider satisfactory, as intimated in the 2nd paragraph of the Chief Secretary's letter, of the 31st of the same month.

5. Had Regulation IV. of 1813 been enacted when the Muttabanga first became navigable in the year 1810, the Board conceived it probable that a sum would have been collected from the Boats passing through that Channel equal to the decrease in the collections derived from Boats in their transit through Tolley's Nullah, which occurred during the years under consideration; and to enable the Honorable the Vice-President in Council to form a judgment on this point, I am directed to submit the subjoined statement.

Deficiency in the collections from Boats in Tolley's Nullah in the years 1810-11 and 1811-12	18,401	0	0
Amount of collections from Boats in the Muttabanga River during the dry months of the two first years after the establishment of the Toll, during which months the Nullah was formerly not navigable. ..	38,754	0	0
Excess, ...	20,353	0	0

I have the honor to be,
Sir,
Your most obedient Servant,
G. WARDE,
Acting Secretary.

REVENUE BOARD:
The 12th September, 1815.

No. 75.

Revenue

Resolution.—It appears to the Governor General in Council, that without employing a professional Officer, neither the extent of the work required, nor the proper rates at which it ought to be executed, can be ascertained: still less would the due completion and permanent utility of the work be secured.

2 His Lordship in Council accordingly resolves, that Lieut. J F. Paton, of the Engineers, be immediately directed to examine the Nullah, and to prepare an estimate of the expence to be incurred in putting it in a good navigable condition.

3 The estimate will of course be framed on the supposition that none but hired labourers are to be employed

4. The propriety, however of employing a certain number of convicts, with a view of reducing the expence, will be considered in the Judicial Department.

5 Should Lieut Paton, on examining the Nullah, see ground to recommend that the excavation of any particular part should be immediately undertaken, without waiting until the whole can be surveyed and a regular estimate formed, he will be instructed to bring the subject without delay to the notice of Government

6 The amount of the allowances to be assigned to Lieut. Paton, for the performance of the above duty will be hereafter determined.

The 11th January 1820

No. 77.

H MACKENZIE, ESQ.,

Secretary to Government Territorial Department.

Sir

In conformity with the instructions contained in your Letter of the 11th instant, I have the honor to state that I have carefully examined Tolley's Nullah, and herein beg to submit my Report, framed on my own observations, aided by the suggestions and opinions of the Local Authorities

1st The Nullah has become impassable except at spring-tides and even then only admits of the navigation of small Boats of 500 maunds burden and under, which are dragged through it with great labour, danger and expence

2nd The evil has occurred not so much from the sediment precipitated by the floods, as from the filth and rubbish thrown into the bed by the inhabitants of the villages and Bazars on the Banks, who, in many places, have built their huts on the very edge, and thereby materially injured the Canal by interrupting if not altogether stopping up the tracking path.

3rd The great labour at present required, and delays that occur, as well as uncertainty in passing the Nullah at all, prevents the Native Merchants from sending a large portion of their Boats through this Canal, and induces them in many instances to prefer land carriage, whereby their profits are much lessened, and the Revenue very considerably diminished.

4th. To effect a partial removal of the obstructions, such as sunken Boats, trees, and broken masonry or to make casual cuts through the points that are most choked, would, in my opinion, be a most unprofitable and useless expenditure, as the Channel so evidently requires a general clearance throughout. The quantity of mud and filth that has been lodged

may be taken on an average to be 6 feet in depth, which is not surprizing under the consideration that about 45 years have elapsed since the original completion, and that it has only once undergone a trifling repair in 1806.

5th. I beg strongly to recommend that the Channel be entirely re-opened, and this I would urge for three primary objects; the health of the inhabitants who occupy the tract of country through which it passes; the great increase of Revenue to the Government, and the Commercial interests of the Metropolis.

6th. Another important reason I may give for the adoption of this plan, is, that in any case the navigation must for the time be stopped, and great inconvenience felt, as well as public loss in the suspension of the usual collections, it will therefore be advisable to have the work well finished, so as to supersede the necessity of an early repetition, which would unquestionably be required in a few years, unless the rubbish were entirely removed: whereas by a complete clearance, the Canal may be rendered serviceable for at least 20 years, so as to admit country Boats of the largest dimensions, instead of remaining as at present confined to the use of small craft.

7th. I would also suggest the improvement of a thoroughfare being made of 50 feet on each side, all along the course, and when the Canal is opened, that an establishment be kept up and stationed at proper distances to prevent the Natives from destroying it, by throwing in rubbish or making excavations to injure the Banks. I have no doubt but that on due investigation it will be ascertained, that the greater part of the ground to which I allude is the property of Government, to which the occupants can produce no right or title, but have gradually raised their huts and bazars on finding they were not prevented; for it can scarcely be supposed, that the Projector of the Canal should have neglected to secure so material a point, as without a road for the dandies to track, the Boats must remain for the favour of the tide, which must tend to crowd and impede the passage.

8th. The nature of the work is such, that it is only possible to furnish a rough estimate of the cost, for neither the labour nor quantity of soil to be removed can be exactly ascertained, as the calculation must rest on the average of a number of sections taken at different parts; and it may be proper to mention, that the execution will be attended with greater expence than in a new cut, on account of the additional trouble in displacing the water that is settled in the bed, as well as in constructing Banks to keep out the tides.

9th. The annexed estimate I do myself the honor to present with the hope, that the execution if authorized, may be considered to be strictly on trust, and that the detailed accounts of the expenditure may be furnished when it is finished and surveyed.

10th. As the work can only be properly carried on during the dry weather, and as the season is already so far advanced, little can be done this year, unless an early determination is formed. I beg therefore to say, that I am perfectly prepared to commence operations whenever I am favoured with orders to that effect, and that no exertion in my power shall be wanting to do every justice to the charge in directing and expediting the progress, and in regulating the disbursements with the utmost attention to economy and advantage.

I have the honor to be, Sir,

Your most obedient Servant,

J. F. PATON,

Lieut. of Engineers.

CALCUTTA:
29th January, 1820.

No. 77.

Estimate of the probable Expence to be incurred in opening Tolley's Nullah, so as to put it in a good navigable condition, by removing the filth and rubbish with which it has become choked, and deepening the Channel; also of clearing two small Harbours, one at Tolley Gunge, and the other at Gooreah Hath.

DIMENSIONS.

	M.	F.	P.	F.
Total Length of Nullah from the Hooghly to the Salt Water Lake, .	13	5	21	3½
Or Running Feet, ...	72,000			

General average of a series of Sections taken throughout the Nullah of the part to be removed, .. 60 feet broad and 6 feet deep.

Dimensions of two Harbours to be cleared, each 1500 feet long, 100 feet broad, and 10 feet deep

Five Bunds required to keep out the Tides during the execution to be formed, and afterwards removed, each 90 feet long, 36 feet broad, and 12 feet high.

Expence calculated from the foregoing data.

	Length.		Breadth.		Depth.	No		Solid Feet.
Nullah, .	72 000	×	60	×	6		=	25,920,000
2 Harbours, .	1,500	×	100	×	10	2	=	3,000,000
5 Bunds,	90	×	36	×	12	5	=	194,400

Total Solid Feet of Soil to be removed at the rate of 4 Rupees for every cube of 9 feet, or 729 Solid Feet,	29,114,400			
		1,59,749	12	1
Tools required, as Fowrahs, Shovels, Hatchets, Pickaxes, Rods, Pickets, Levels, &c. &c., ...		15,000	0	0
Bamboo Baskets 150,000, at the rate of 5 Rupees per 100, ...		7,500	0	0
40,000 Head Cushions, at the rate of 2 Annas each, ...		5,000	0	0
Choppers required for the accommodation of the workmen, ...		3,000	0	0
Establishment for the Superintendence, ...		8,000	0	0
Total Estimate, Calcutta Sicca Rupees One Hundred and Ninety-eight Thousand, Two Hundred and Forty-nine, Twelve Annas, and One Pie . . .		1,98,249	12	1

CALCUTTA
20th January 1820

J F PATON *Lieut. of Engineers.*

N. B.—By reference to an Estimate drawn out by Lieut. Colonel Garstin, of Engineers, in 1805, it will appear that there is only a difference of Cal. Sa. Rs. 13,000 between this calculation and what was supposed by that Officer to have been required fourteen years ago, since which the accumulation has of course much increased, and provision has consequently been made to excavate one foot deeper than Colonel Garstin had then projected.

To account for the rates that have been assumed for the excavation it is necessary to explain, that they include the expence attending the dislodgement of the water as well as the disposal of the earth by filling up holes or otherwise spreading it along the banks in the most advantageous manner to prevent any future removal.

No. 78.

Revenue—Bengal, &c.

Resolution.—With reference to the advanced period of the year, it appears that little progress could be made towards the completion of the work in the present season, and as the passage of Boats through the Canal must be wholly stopped whilst the proposed operations are going forward, it seems to be desirable to postpone the measure until the obstructions which interrupt the navigation of the Matabhanga and Choornee Rivers are removed or lessened; this it may be hoped will be, in a great measure, accomplished before the ensuing rainy season.

If the proposed work be commenced as soon after the termination of that season as possible, and the interim employed in making preparations for it, His Lordship in Council would hope that the whole might be accomplished in a single season, and the expence may likewise be limited by the employment of a greater number of convicts than could now be appropriated to the purpose.

Under these considerations His Lordship in Council resolves to postpone for the present the adoption of the measures proposed by Lieutenant Paton.

It seems at the same time probable, that considerable immediate advantage might result from operations of a more limited nature, and the importance of the Canal as a branch of inland navigation is such as to make it clearly advantageous to secure a free passage through it even for a single season, at an expence of some thousand Rupees.

His Lordship in Council therefore directs, that Lieutenant Paton be called upon to Report whether the navigation of the Canal in the present season could be materially improved by the removal of such partial obstructions as can be removed without closing the Nullah or incurring a charge of more than two or three thousand Rupees.

The 4th February 1820.

No. 79.

H. MACKENZIE, ESQ.

Secretary to Government, Territorial Department.

SIR,

I have the honor to acknowledge your Letter under date the 4th instant, transmitting copy of the Resolution of Government on the proposed Plan for opening Tolley's Nullah, as suggested in my Report of the 29th ultimo.

On every consideration it appears to me preferable to postpone the work until the conclusion of the rains, but to admit of its being accomplished in one season it will be necessary to have every preparation previously made, for which I hope I may be favoured with orders to enable me to give the satisfaction I should so earnestly desire.

In reply to the concluding paragraph of the Resolution I beg to state, that the navigation of the Canal for the present season may be considerably improved by the expenditure of 4 or 5,000 Rupees, in adopting the measures* recommended by the Collector of the 24 Pergunnahs for the removal of the obstructions at the Kidderpore Bridge, at Russapuglah, and at Goorcah Hath, the original Estimate for which was forwarded to your office by Mr. Trower, framed by

* Note.—See Index to this Appendix Paper marked No. 74 a, or Territorial Department Consultation 11th January 1820, No. 9 ½.—J. M.

Sunker Mistry, an experienced and intelligent Native, formerly in the employ of Colonel Tolley.

I am prepared to carry the foregoing measure into effect immediately, by employing separate parties on the several points at the same time, and if convicts could at present be furnished in any number, it would be performed with expedition and economy.

I have the honor to be, Sir,
Your obedient Servant,
J. F. PATON, *Lieut. of Engineers.*

CALCUTTA:
9th February, 1820.

No. 80.

To LIEUT. J. F. PATON.

Revenue—Bengal

SIR,

I am directed to acknowledge the receipt of your letter, dated the 9th instant, and to inform you, that the Most Noble the Governor General in Council has been pleased to authorize you to adopt the necessary measures for removing the obstructions referred to in the 3rd Para. of your letter, and to disburse on that account a sum not exceeding Rs. 5,000.

2. The Collector of the 24-Pergunnahs will be directed through the proper channel to advance the above amount in such proportions and at such periods as you may require the money.

3. A copy of your letter will be sent to the Judicial Department, whence the Magistrates of the Suburbs of Calcutta and of the 24-Pergunnahs will be instructed to furnish you with such a body of convicts as may be available for the purpose.

4. You will hereafter be apprized of the Resolution of Government in regard to the more extensive work proposed in your report of the 29th ultimo.

I am, &c.,
(Signed) H. M.

The 14th February, 1820.

No. 81.

To HOLT MACKENZIE, ESQ.,
Secretary to Government, in the Territorial Department.

SIR,

In compliance with the Orders of Government, contained in your Letter of the 14th February last, I have used every endeavour to improve the Channel of Tolley's Nullah, as far as could be effected, without constructing Bunds to interrupt the navigation, and I have now the honor to report, that I have succeeded in considerably facilitating the passage by employing people to make cuts and clearances where it had become most obstructed, so that Boats can now pass freely at common Tides, without being detained for the springs.

2. Enclosed I beg to transmit my account of the expenditure attested in the prescribed manner, detailing the numbers and descriptions of workmen employed at the several points, and about Sa. Rs. 850 : 0 : 0 less than the sum allowed by Government.

3. The quantity of soil that has been raised at the different places, could not be exactly ascertained, as the people were always obliged to work in the water, on which account I could not prevail on them to undertake it by contract, and the only check I therefore had over them, was the increase observable in the depth of the Channel, and the general improvement of it.

4. In conclusion I have to request, you will do me the favour to obtain the decision of Government on the allowances to be assigned for this duty, in conformity with the last paragraph of the Resolution of 11th January last, since which date I have been engaged on the Nullah.

I have the honor to be, Sir,
Your obedient Servant,
J. F. PATON, *Lieut. of Engineers.*

CALCUTTA:
26th May, 1820.

No. 81. *a.*

Account of the Expence incurred in making several Cuts and Clearances in Tolley's Nullah, agreeably to the Orders of Government, communicated by the Secretary in the Territorial Department, under date 14th February, 1820.

Places where the Cuts have been made	Workmen employed at the several points. Sirdars.	Mates.	Coolies.	Boys.	Raj Mistries.	Total number of workmen.	Total Expence at each several point. Rs. A. P.	Total Expence. Rs. A. P.
Gooreah Hat'h or Ghaut, ..	45	228	6,186	534	.	6,993	804 1 8	
Pootree and Temohunny, ..	146	444	14,129	991	.	15,710	1,814 8 1	
Bansdhunny,	2	4	220	10		236	27 5 11	
Allipore Bridge,	68	122	4,658	154	64	5,066	594 3 3	
Kidderpore, ..	34	76	3,140	370	.	3,620	412 15 5	
Total Rupees,	295 @ 5/0 each per mensem	874 @ 4/0 each per mensem.	28,333 @ 3/8 each per mensem	2,059 @ 2/8 each per mensem	64 @ 5/0 each per mensem.	31,625	.. .. ..	3,653 2 4

Establishment for Superintending and paying the Workmen.

1 Head Overseer, from 15th February to 15th May,	50 0 0	
5 Sircars, employed at the different places, from the 15th February to 15th May, at 10/0 Rs each per mensem,	150 0 0	
5 Lascars, to superintend the workmen, from 15th February to 15th May, at 5/0 Rs. each per mensem,	75 0 0	
		275 0 0

Baskets, Tools, &c used in completing the work.

2000 Bamboo baskets for raising the mud, at 4/0 Rs per 100,	80 0 0	
Bamboos, Twine, Gurran-sticks, &c &c,	12 4 0	
140 Fowrahs, at 0/12 annas each,	105 0 0	
9 Iron Crowbars, for breaking the masonry under the Bridges,	18 0 0	
		216 4 0

Grand Total, Calcutta Sicca Rupees Four Thousand One Hundred, and Forty-four, Six Annas and Four Pie, . Cal Sa. Rs., 4,144 6 4

I do hereby declare on honor, that the sums contained in this Bill have been Expended for the purposes set forth.

J. F. PATON, *Lieut. of Engineers.*

No. 90.

No. 2626.

To His Excellency the Most Noble
FRANCIS, MARQUIS OF HASTINGS, K. G. and G. C. B.,
Governor General and Commander in Chief, &c. &c. &c.
in Council, Fort William.

Miscellaneous.

My Lord,

We have the honor to acknowledge the receipt of Mr. Secretary Mackenzie's Letter of the 21st instant, transmitting an extract from the proceedings of the Government, in the Judicial Department, under date the 7th instant, and desiring us to furnish a Report of our sentiments on the subject therein noticed.

2nd. As it appears from the 2nd Paragraph of the Letter* from the Superintendent of Police, dated the 31st ultimo, that the Ferries of Kalyghaut, [? Chytala] Bausdoony, Gurrya, Teetalbarya, and Khurribarya [? Taimohoonee], are not included in the List of Ferries made over to the Magistrate of the Suburbs under the Provisions of Regulation VI, of 1819, we are of opinion, that these Ferries may, as formerly, continue under the superintendence of the Collector of the 24-Pergunnahs.

3rd. As the Revenue will probably be devoted to the maintenance of very important and beneficient public purposes, and as it is likely there will be Officers of Police, of Customs, of Salt, and of Opium stationed about the Bridge in question, it is being very sanguine to expect that those who frequent this Bridge to convey their goods into Calcutta, will be allowed under any circumstances of precaution to pass entirely free of assessment, we think it is advisable that a well defined and moderate Toll should be levied on the Gurryahaut Bridge, whenever finished, which would operate to check oppression and prove a security rather than an injury to the Public; and excepting that, with reference to the apprehension which may be justly entertained that a Toll levied on foot passengers generally must be grievous and distressing to the lowest classes of the people, we would recommend that all foot passengers be exempt from Toll. We think no better rate of Toll for the Gurryahaut Bridge can be adopted than that appointed for Ferries under Clause 5, Section 2, Regulation XVIII, of 1806.

4th. We are entirely of opinion, that it is highly desirable the funds realized by the proposed Toll on Gurryahaut Bridge and by the Ferries, Kallyghaut, &c. enumerated above, should be applied to the purposes provided for by Section 7, Regulation VI, of 1819; and we beg to recommend the application we have suggested to the sanction of your Lordship in Council.

We have the honor to be, with respect,
My Lord,
Your Lordship's most obedient, and very humble Servant,
J. PATTLE.
W. B. MARTIN.

Revenue Board:
The 28th September, 1821.

* Territorial Department, Consultation 2nd September 1821, No. 9. "The annual amount realized from this [Kalyghaut] Ferry during the last 3 years was—in
1818 Rs. 1865
1819 ,, 1789
1820 ,, 1945"
The average Toll of the above and the other Ferries equal rather more than 750 Rs. each per annum, making an annual Total of about Sa. Rs. 3,000.—J. M.

No. 94.

No. 702.

To HOLT MACKENZIE, ESQ.,

Secretary to Government, in the Territorial Department,
Fort William.

SIR,

I am directed by the General Management of the Military Orphan Society to request the favour of your laying before the Most Noble the Governor General in Council, their solicitation of some assistance in order to secure and improve the navigableness of Tolley's Nullah between the two Bridges at Kidderpore and Allypore.

A great part of the South Bank of the Nullah between these limits belong to the Military Orphan Society, and has recently sustained considerable damage during a Contract, in virtue of which, the Huts and Buildings on the Bank were farmed by a Native. The damage in question consists of considerable Falls of the Bank in consequence of the eddy occasioned by the direction of the Bank opposite, and may, by the same cause, apparently extend to a still more considerable loss of the Orphan property.

Understanding it to have been under the consideration of Government to secure or improve the navigableness of the Nullah, the General Management would solicit, that in the event of there being any arrangement made for these ends, the early attention of any person appointed to the charge may be directed to the particular part specified. Or should there be any person in public charge of the Banks of the River, and commissioned to repair or prevent damages of the Banks, it is solicited that the advantage of this appointment may be extended so as to include the part of the Nullah in question: the public interests being involved in the matter under representation, together with the Orphan interests, to which also the Government has been so readily attentive.

In the event of there being no established provision for the care either of the Nullah or of the Banks of the River, the General Management would beg the favour that Government would direct the Magistrate of the Suburbs to accommodate the Orphan Institution with the services of a party of convicts, and as the work required is of considerable urgency, lest it be not completed before the rains, it would be very gratifying if Government would direct that the supply of convicts for this purpose may be as liberal as can be afforded with due regard to other interests of the public.

I have the honor to be, Sir,
Your faithful Servant,
J PARSON,
Secretary Military Orphan Society.

KIDDERPORE:
26th April, 1822.

No. 96.

To H. MACKENZIE, ESQ.,

Secretary to Government, Territorial Department.

SIR,

According to the instructions conveyed in your letter of the 2nd instant, I have carefully examined the portion of Tolley's Nullah therein referred to.

The part of the Bank in question, which has most materially suffered from the effects of the stream, is that immediately to the eastward of Kidderpoor Bridge; where the eddy water has excavated a bay of considerable magnitude, and is making further encroachments every succeeding year. From the eastern extremity of this bay to the Allypoor Bridge, the encroachments of the Nullah on the southern Bank do not appear to be greater than in other parts of its course.

It is scarcely necessary to mention, that the cause of the eddy exists in the contracted span of the Kidderpoor Bridge, through which the stream rushes with considerable violence during the high tides in the rains.

As long therefore as the Channel under the Bridge remains so disproportionally contracted, it will be fruitless to attempt to prevent the formation of eddies on the eastern side of the Bridge in the rainy season. The most effectual means of remedying the evil complained of, is the erection of a new Bridge, with a span equal to the general width of the Nullah. The stream may then be expected to flow with an uniform velocity in every part of its course, and the land which has been washed away, as before described, may be regained by alluvial deposits.

As a temporary precaution however, against further encroachments, some advantage may be expected to result from defending the part of the Bank, which is at present in danger, by a facing of brick or stone ballast.

Piles are sometimes employed for a similar purpose; but their use appears to be seldom attended with success. The ground in which they are driven, being usually of so loose a nature, that they are soon undermined, and swept away by the current.

At the same time that the above-mentioned precautions are taken to secure the Bank from further injury, an attempt may be made to divert the course of the eddy into a different Channel, which might perhaps be effected by cutting off a point of land on the north side of the Nullah; thereby giving a contrary bias to the stream. The expediency of adopting this measure, will of course depend on the relative value of the land on each side of the Nullah.

The remaining part of Southern Bank, from the east end of the bay to Allypoor Bridge, is in good order, with the exception of that which is above the level of high water in the dry season. All that is therefore requisite to preserve it from further damage, is to slope the upper surface to the same angle with the rest of the Bank.

Near the Allypoor Bridge the ground could not be sloped in the above manner without intrenching on a Public Road, which runs nearly parallel with the Nullah, between the two Bridges. It is of the utmost importance to the welfare of the Gunge, that this thoroughfare be kept open. It would therefore be advisable to fill up the hollow that has been excavated at this place, with earth brought from the opposite side, which should be well rammed down and turfed.

The expence of the above-mentioned repairs may be nearly estimated at the following sum:—

50,000 Bricks for coating the bed of the Nullah in the bay,	300	0	0
Laying the same,	50	0	0
Banking in 400 feet near the Bridge with earth from the opposite side,	100	0	0
Securing the new-formed Bank with Bamboos,	100	0	0
Sloping 2,500 feet of Bank,	150	0	0
Banking in the hollow near the Allypoor Bridge,	50	0	0
Total, Sa. Rs	750	0	0

Future injury to the Bank from the force of the stream may be guarded against, by annually filling up, before the rains set in, any ravines or holes that may have been accidentally formed during the past year. A prohibition by the proprietors should also be made against erecting huts on the verge of the Bank. This object might perhaps be better attained by laying a narrow puckah footpath on the top of the Bank, the whole length between the two Bridges.

I have the honor to be, Sir,
Your obedient Servant,
J. AUG. SCHALCH, *Lieut.*,
Deputy Assistant Quarter-Master General.

CALCUTTA:
May 21st, 1822.

No. 101.

No. 24

FROM G. A. BUSHBY, ESQ.,
Secretary to the Government of India,

TO F. J. HALLIDAY, ESQ.,
Secretary to Government of Bengal

Dated the 7th January, 1846

Home Department Revenue

SIR,

In reply to Mr. Under-Secretary Beadon's letter No. 1056, dated the 10th ultimo with enclosures, I have the honor to furnish for the use of the Municipal Committee Copies of the papers marked 2 to 4 in the list therewith submitted, none of the remainder applied for, being forthcoming in this office.

I have the honor to be &c.,
(Signed) G. A. BUSHBY
Secretary to the Government of India

COUNCIL CHAMBER,
The 7th January, 1846

Not forthcoming in the Office of the Secretary to Government, Home Department	1. Plans referred to in Public Department Consultation 20th December 1775, No. 21
Sent	2. The Resolution of Government of 21st April 1777, referred to in Order of Government, dated 24th July, 1777
	3. Copy of Lease or Grant to Major Tolley, referred to in Public Department, Consultation 4th September 1777, No. 5
	4. Opinion of Chief Engineer referred to in Order of Government, dated 30th March 1778, No. 12
Recorded in the Revenue Consultation Papers in the Bengal Office	5. Answer to Major Tolley's letter of 24th August 1781, recorded as No. 5 in Revenue Department Consultation of 11th September 1781.
Deposited in the General Treasury as per Government Order, dated 21st February, 1787	6. Copy of Lease granted to Mrs. Tolley, referred to in an extract of a letter from the Court of Directors, dated 11th April 1785
Recorded in the Revenue Department Papers in the Bengal Office	7. Answer of Government to the letter of the Members of the Board of Revenue, dated 5th April 1796, recorded as Nos. 17 and 18, Revenue Department, Consultation 29th April 1796

(True Copies.)

CECIL BEADON,
Under-Secretary to the Government of Bengal

THE END

BISHOP'S COLLEGE PRESS: CALCUTTA.

APPENDIX (K).

Contents.

APPENDIX (K.)

No. I.

Extract.—Proceedings of the Committee upon the Fever Hospital and Municipal Improvements, 22nd April 1844.

IN CIRCULATION

To THE COMMITTEE UPON THE FEVER HOSPITAL AND MUNICIPAL IMPROVEMENTS.

&c. &c. &c.

Municipal Office, Town Hall: dated the 22nd May, 1843.

The Chairman has the pleasure to send in Circulation, to the Members of the Committee, a Letter received by him yesterday from the Under-Secretary to the Government of Bengal, in answer to his Letter of 5th April ultimo, addressed to the Secretary to the said Government regarding the intention of the Government to aid by their contribution, the funds raised by private subscription for the erection of a Fever Hospital. He also sends in Circulation a copy of his said Letter of 5th April, in which it will be observed that he called the attention of the Government to the hope which my Lord Auckland had held out to the Governours of the Native Hospital and the subscribers to the Fever Hospital, that aid might be contributed from the revenues of the State not exceeding what might be needed for the first foundation of the Hospital. Unhappily the Government, admitting its intention as expressed by Lord Auckland, declares itself debarred by present financial considerations from fulfilling the hope so held out—and it is for the Committee under these circumstances to determine what course it should take in regard to the disposal of the sum subscribed.

1st. The Chairman apprehends that power has been conferred by the subscribers on the Committee, to expend the sum subscribed at their discretion, devoting the same in the best and most economical manner in their judgment, to the erection of a Fever Hospital for the support of which sufficient permanent Funds shall be provided, either by setting apart the subscribed Fund in part for this purpose or otherwise

2nd He is of opinion, that the erection of a *Fever Ward* attached to the Native Hospital —the Governors of that Hospital undertaking that the Medical Officers of that Hospital shall duly attend to the patients received into that ward, in as great numbers as a ward of the most spacious dimensions which can be erected for the money subscribed will contain, and to supply such patients with the requisite number of Hospital attendants, with medicines, food and comforts—will accomplish more for the relief of the native poor attacked by fever than could be accomplished by any other mode of appropriating the subscriptions at the Committee's disposal, and thus answer to the greatest amount possible, the intentions of the subscribers.

3rd. He considers it hopeless after the length of time that has elapsed since this Committee's First Report has been transmitted to the Court of Directors—and after the answer now received from the Government of Bengal—to wait for any aid from the Government of Bengal or of India Nevertheless he desires to have the opinion of the Committee on

the propriety of laying the matter before the Governor General, previous to their ultimately disposing of the funds in their hands.

If the Committee are of opinion that they ought to submit the matter to the Governor General, the Chairman will frame a letter to His Lordship accordingly, and send the Draft in Circulation. If otherwise he will frame and send in Circulation the Draft of a Letter to the Secretary to the Native Hospital, agreeing to apply the Funds to the erection of a Fever Ward attached to that Hospital on the conditions mentioned above.

No. I. *a.*

To THE HONORABLE SIR J. P. GRANT,

&c. &c. &c.

HONORABLE SIR,

I am directed by the Governors of the Native Hospital, to call your attention to the following Resolution passed at their General Annual Meeting, held on the 21st ultimo.

I have the honor to be,
Honorable Sir,
Your obedient Servant,
R. STUART, M. D.,
Secretary, Native Hospital.

CALCUTTA, NATIVE HOSPITAL:
21*st March*, 1843.

No. I. *a.*[1]

Extract from the Proceedings of the General Annual Meeting of the Governors of the Native Hospital, held on the 21st February, 1843.

Resolved,—That Sir John P. Grant be requested to ascertain whether it would be consistent with the views of the Fever Hospital Committee to apply the Funds in their hands, for the erection of a Fever Hospital, to the erection of a Fever Ward attached to the Native Hospital.

A true Copy.
R. STUART, M. D.,
Secretary, Native Hospital.

No. I. *b.*

No. 992

To DR. STUART,
Secretary, Native Hospital.

SIR,

I have received your Letter of the 21st instant, by direction of the Governors of the Native Hospital, calling my attention to the Resolution of the Governors, passed on the 21st ultimo, that I be requested to ascertain whether it would be consistent, with the views of the Fever Hospital Committee, to apply the Funds in their hands for the erection of a Fever Hospital, to the erection of a Fever Ward attached to the Native Hospital. I will not fail to bring this matter before the Committee at its first Meeting, which I think will take place next week.

I am, Sir,
Your most obedient humble Servant,
(Signed) J. P. GRANT.

CHAMBERS, SUPREME COURT:
23rd March, 1843.

No. I. *c.*

No. 1002.

To R. STUART, Esq.,

Secretary to the Native Hospital.

SIR,

I am directed by the Honorable Sir J. P. Grant, with reference to your communication dated the 21st ultimo, to his address, to transmit to you the enclosed Copy of a Resolution passed by the Committee upon the Fever Hospital and Municipal Improvements at their Meeting held on Wednesday, the 5th instant.

I have the honor to be,
Sir,
Your most obedient Servant,
(Signed) J. MORRIS.
Clerk to the Committee

MUNICIPAL OFFICE, TOWN HALL,
7th April, 1843.

No. I. *c.*(1)

Extract.—Proceedings of the Committee upon the Fever Hospital and Municipal Improvements, Wednesday, the 5th April, 1843.

1st. Resolved,—That with reference to the Letter dated 21st March 1843, marked No. XXXIII, from the Secretary to the Native Hospital, transmitting Copy of a Resolution passed by the Governors of the Native Hospital on the 21st February 1843, requesting Sir J. P. Grant to ascertain whether it would be consistent, with the views of the Fever Hospital Committee, to apply the Funds in their hands for the erection of a Fever Hospital, to the erection of a Fever Ward attached to the Native Hospital, the Governors be informed that the Committee upon the Fever Hospital and Municipal Improvements, keeping in view their Report submitted to Government on the 7th January 1840, think it proper before replying to the proposition of the Governors of the Native Hospital, to submit their proposition to His Honor the Deputy Governor of Bengal, upon whose reply the tenor of the Committee's reply to the Governors will much depend.

(A true Extract.) *(Signed)* J. MORRIS,
Clerk to the Committee.

No. I. *d.*

No. 1001.

To F. J. HALLIDAY, Esq.,

Secretary to the Government of Bengal.

SIR,

I have received from the Secretary to the Native Hospital, and have laid before the Committee upon the Fever Hospital and Municipal Improvements, the Papers of which and of my answer to which, I have the honour to enclose copies.

I have also to state that the subscription received for the Fever Hospital and now in the hands of the Committee's Treasurer, the Union Bank, amounted on the 31st December

1842, to Company's Rupees	52,037	5	5
and that the amount of subscription not yet received was on the same date Company's Rupees	6,675	7	9
	58,712	13	2

In the Report of our Committee to the Honorable the Deputy Governor of Bengal, of date the 7th January 1840, pages 1 to 4, will be seen the manner in which the subscription for the erection of a Fever Hospital originated, and the grounds upon which subscriptions were obtained; and from pages 4 to 10 the views taken by Government at that time on that subject; and at pages 235, 236, 237, 238, will be found the General Report of the Committee to the Government relative to the Establishment of a Fever Hospital.

The Committee not having received any intimation of the intentions of the Government relative to the contribution, the Government is disposed to make in aid of the private subscriptions obtained for the establishment of a Fever Hospital, think they cannot with propriety dispose of the fund in their hands, which they have retained with the knowledge and sanction of the Government for the purpose of such co-operation, without first obtaining the approbation of the Government.

At the same time so long a period has elapsed since their Report was submitted to the Government, that they are left in uncertainty as to the probability of the Government eventually contributing its aid to the very important object for which in the first instance the Committee was established.

I have the honour to be,
Sir,
Your most obedient and humble Servant,
(*Signed*) J. P. GRANT,
Chairman Municipal Committee

Municipal Office, Town Hall,
5th April, 1843.

No. 1. *e*.

No. 686

From UNDER-SECRETARY TO THE GOVERNMENT OF BENGAL.

To THE HONORABLE SIR J. P. GRANT,
Chairman Municipal Committee on the Fever Hospital.
Dated, Fort William, 10th May, 1843.

Judl.

Honorable Sir,

I am directed by the Honorable the Deputy Governor of Bengal, to acknowledge the receipt of your Letter No. 1001, dated 5th ultimo, with its enclosures, and to inform you in reply, that His Honor is fully sensible of the importance of the object proposed by the Committee and of their benevolent and useful labors for the attainment of it.

2nd. The intention expressed by Government of affording under certain conditions, the aid that might be needed for the first foundation of the Hospital, would under more favorable circumstances have probably been fulfilled; but adverting to present financial considerations, His Honor deeply regrets that Government is debarred from incurring any avoidable expenses, especially such as may be expected to be defrayed by the wealthy community of Calcutta.

3rd. I am further desired to express His Honor's full consent, that the Committee should expend the funds at their disposal in such a manner as may seem to them best fitted to carry out the views of the subscribers.

I have, &c.,
(*Signed*) CECIL BEADON,
Under-Secretary to the Government of Bengal

No. II.

No. 2010.

To CAPTAIN H. GOODWYN,

Civil Architect, &c. &c. &c.

SIR,

I am instructed by the Honorable Sir J. P. Grant, Chairman of the Committee upon the Fever Hospital and Municipal Improvements, to transmit with his compliments, the accompanying Plans (as noted on the margin) of a Fever Hospital received, favored by Dr. Strong, from the Secretary to the Council of Education, and to request you to be so good as to state in writing, in what particular *your* plan provides, in respect to convenience, fittings-up, internal arrangements, and space allowed to each patient, which are not provided for by the above plans; and the probable cost of such difference. The favor of your answers to the same questions with reference to the *above* plans, and yours, is also requested.

Plan by Burn and Co. in 3 sheets, with Letter and Estimate annexed.
Plan by Mr. Parker in 2 sheets, with Letter and Estimate.
Plan of the grounds of the Medical College, its neighbourhood and statement of the value of the same.
A rough Design by Capt. Goodwyn of a Building for the proposed Fever Hospital to hold 170 patients and to cost Rs. 1,05,000.

The Committee, on being furnished with the above details, will be able to form a more *ready* and safe opinion of the relative merit and expense of each plan, than they would in the absence of such information.

The Committee will meet possibly on Saturday or Monday afternoon next, to take into consideration the above plans: due notice will be given you of the day and hour on which the Committee will meet. Your answer, at your earliest convenience, will oblige.

I have the honor to be,
Sir,
Your most obedient Servant,
(Signed) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE, TOWN HALL:
12th February, 1845.

No. II. *a.*

To F. J. MOUAT, Esq.,

Secretary to the Fever Hospital Committee.

SIR,

You having done me the honor to ask me for a Plan for a Fever Hospital, I have to the best of my ability made two* Plans, Nos. 1 and 2, which I have now the pleasure to lay before you.

* These Plans re with Doctor Iouat J M

Plan No. 1 was first made, and finding that the amount of the Estimate for it, exceeded the Estimate of Major Fitzgerald by Co's. Rupees 50,000, I was induced to begin another on a smaller scale, and produced No 2, which I find sufficiently large to accommodate 226 Patients, without crowding, and the cost to be Co's. Rs. 1,13,843. In this Plan, No. 2, there are seven Wards on each floor, to accommodate 14 Patients, and one Ward for 10 Patients, making a total of 108 on each floor, or 216 on both floors, there is besides sufficient space on the upper floor, (over the rooms on the first floor, intended for Surgeon's room, Dispensary, and Apothecaries' rooms,) for the accommodation of ten other Patients, and I do not think these rooms can be required for any other purpose.

In the larger Plan No. 1, there are eight Wards, that will accommodate in each 18 Patients, and two Wards each for 20 Patients, and making a total of 184 on each floor, and with the rooms (over the Dispensary, Surgeon's rooms and Apothecaries' rooms,) which are capable of containing 16 Patients, will make the total number in the building to be 384, and the amount of the Estimate is Co's. Rs. 1,47,520.

In arranging the Piers inside the Wards, I have departed from the strict architectural Plan of making them to range with the external piers, but have arranged them so that each

pier shall just be sufficient in breadth to allow a Patient's cot to be placed against it, with a free space of archway between each cot throughout the building, thus a person standing in the East or West Verandahs, can look through the internal archways, and not see a Patient's cot, and this Plan I think will allow of a better circulation of air than if I had kept to strict architectural usage, and by counting the piers (shaded dark) on the Plan, and which are each $2\frac{1}{2}$ feet wide, you get at the number of Patients that can be received on each Plan, without drawing in the cots, which you will observe I have omitted. In planning the elevation I have adhered to one that I have seen to answer well, and that is, the house now occupied as the "Martiniere for Girls." The basement story is $10\frac{1}{2}$ feet high, and its roof arched, as is shewn in the longitudinal Section, the first story above the basement, is 21 feet high outside, or 19 feet clear under the beams inside: the upper story is also 21 feet high outside, surmounted with a parapet wall 2 feet high, and the roof of the nine Wards inside are carried up to the top of the parapet, giving a clear height inside the Wards under the beams of 21 feet, by thus carrying up the walls of the Wards two feet higher than the adjoining ones, an aperture may be left on each side of every beam, which will serve to ventilate the building in a superior manner, and the projecture of the roof outside of the walls of these Wards, will serve to place under a leaden main pipe, to which branch pipes may be attached, that will convey water to every room in the building by means of force pumps from below.

I have not followed Major Fitzgerald's Plan in the arrangement of the Verandahs, for I am of opinion, that one single enclosed Verandah, 18 feet wide, will answer equally the purpose of two narrow Verandahs, 14 and 12 feet wide, in the keeping the Wards cool, for at "La Martiniere" there are enclosed Verandahs, 16 feet wide, and I believe there are no cooler rooms in Calcutta than the School and bed-rooms of that Institution, which I had the pleasure of building; at any rate, the expense of double Verandahs may at present be saved, and should it be thought requisite hereafter to have double Verandahs, they may easily be added without injury or disfigurement to the building. The baths and privies on each Plan I think I have made sufficiently large for the number of Patients proposed to be received, but in case they may be thought insufficient, mezzonine floors may be introduced between the height of each main story, as a height ten feet is abundant for all the purposes required for privies and baths, and the stone circular stairs will lead to them I propose to fill up the external spaces or apertures in the basement with strong saul-wood railing, as being cheaper than teak-wood venetians.

In the detailed Estimates (which with your permission) I will submit, I have not made any deductions for "openings" in the brickwork, nor have I inserted any "Contingent Charge" as is done in the Estimate of Major Fitzgerald's, and I have priced the brickwork and flooring at one price, viz. 15 Rupees per hundred feet. I have not included stone flooring for the Wards, as it cannot be properly done for less than 50 Rupees per hundred feet, and that expense, at present, may be spared until the Funds raised are sufficient to allow it; nor have I Estimated for iron tanks, lead pipe, and wells for supplying water to the building, as I cannot determine to what extent it may be necessary for the purpose of the Hospital.

The following is a Statement of the quantity of brickwork contained in each Plan, compared with that of Major Fitzgerald's, by which the different quantities in each may be

	Major Fitzgerald's Plan.		*Plan No. 1.*	*Plan No. 2*
	Feet.		Feet.	Feet.
In the Foundation, ...	22,201		77,655	61,216
,, Basement, ...	1,67,518		1,53,099	1,20,000
,, 1st and 2nd Floors, ..	1,73,200	1st.	1,50,862	1,17,702
Roofing, ...	39,765	2nd.	1,17,279	88,309
		Included as above.		
	4,02,684		4,98,895	3,87,227

The following is a statement of the different Estimates formed on Plans to accommodate different numbers of Patients, viz.

The Cost of a Building for 20 Patients

On Major Fitzgerald's Plan, .	37,021	8	1
Ditto ditto, 30 Patients,	42,376	1	2
Ditto ditto, 120 ditto, . . .	97,778	0	0
Ditto, in my Plan, No 1, 216 ditto. . .	1,13,843	0	0
Ditto No. 2, 384 ditto, ...	1,47,520	0	0

Stone floorings are included in those marked thus*. The dotted line or Plan No 2 shows the outline of the extent of Plan No 1, and the plans, elevations, and sections now submitted, I hope are sufficiently clear to explain and enable you to understand the general design of the Building

I have the honor to be,
Sir,
Your obedient Servant,
(*Signed*) J. P. PARKER
Now of the firm of Currie and Co.

CALCUTTA :
25th October, 1844

No. II. *b.*

To F J MOUAT, Esq.,
Medical College.

SIR,

In the letter that accompanied the two Plans sent to you yesterday, I omitted to state the amount of the Estimate for Building the Plan No. 1 without the second story above the basement, which I find to be Company's Rupees 96,000, and on this one floor one hundred and eighty-four patients may be accommodated, and if the second or upper story be built, the cost will be in addition Company's Rupees 51,520, making a total of Company's Rupees 1,47,520 for the whole Building, as shewn in the elevations and sections on Plan No. 1.

I have the honor to be,
Sir,
Your obedient Servant,
(*Signed*) J. P. PARKER

CALCUTTA :
October 26th, 1844.

No. II. *c.*

To FREDK. J. MOUAT, Esq ,
Secretary Council of Education.

SIR,

Herewith we beg leave to forward you Plan* and Estimate of a Building for a Fever Hospital it is calculated to contain 336 Patients, and should it be found necessary hereafter to have it enlarged, additions can be made at each end with improvement to the general appearance of the whole. The lower story is raised 10 feet from the ground in order to keep it perfectly dry, and also that the lower apartments may be appropriated to the use of servants or any other suitable purpose

* This Plan with Dr. Mouat J M

We have not had sufficient time to enable us to prepare interior sections and other elevations, but should the Plan be approved, we will have much pleasure in preparing whatever may be wished for, and rendering every assistance in our power.

We are, Sir,
Your most obedient Servants,
(*Signed*) BURN AND COMPANY.

CALCUTTA :
24th January, 1845.

No. II. *c.*(1)

Detailed Estimate Expence of constructing a Fever Hospital, agreeable to the Pl submitted for the consideration of the Gentlemen of the Committee.

Foundation of 2 walls each	187 = 371								
Ditto, .. 4 Do. ..	47 = 188								
Ditto, .. 4 Do. ..	31 = 124								
Ditto, .. 8 Do. .	9 = 72								
Ditto, 6 Do.	85 = 510								
Ditto, .. 1 Do. .	31								
Ditto, .. 2 Do. .	42 = 84								
Ditto, . 2 Do. ..	37 = 74								
Ditto, . 1 Do.	31								
		1,488	× 3½	× 2	=	10,416	0		
Ditto, .. 2 Do. .	43 = 86								
Ditto, 1 Do.	30								
		116	× 3½	× 2		812	0		
Ditto, . 1 Do. .		30	× 0½	× 2	=	30	0		
Ditto, 2 Do.	103½ = 207								
Ditto, . 4 Do. .	2½ = 10								
Ditto, 2 Do.	49 = 98								
Ditto, . 1 Do.	2½ = 10								
		325	× 7	× 2	=	4,550	0		
Ditto, 1 Do. .. .		31	× 1	× 2	=	248	0		
Ditto, 4 Do. Backstairs, each 11		44	× 9	× 3	=	1,188	0		
Plinth and Floor of Basement Story, ...		187	× 111½	× 1	=	20,850	6		
Ditto, 2 sides each,	103½ =	207	× 8	× 1	=	1,656	0		
Ditto, 2 sides each,	49 =	98	× 8	× 1	=	784	0		
Ditto, of 30 walls,		1,488	× 2½	× 8	=	29,760	0		
Ditto, of 3 ditto,		116	× 3	× 8	=	2,784	0		
Ditto, of 1 ditto, .		30	× 0½	× 8	=	120	0		
Ditto, of 12 ditto,		325	× 6	× 8	=	15,600	0		
Ditto, of 1 ditto,		31	× 3½	× 8	=	868	0		
						89,666	6		
Base of 2 Pillars each, .		4	× 4	× 10	=	320	0		
Brick Steps,		31	× 21	× 5	=	3,255	0		
						93,241	6	@ 14/ ,oo	13,053 12 9

Arched Floor of Basement Story.

Floor of 8 Rooms each, . .		9	× 9	× 2	=	1,296	0		
Ditto, 2 Do.		39	× 12	× 2	=	1,872	0		
Ditto, 4 Do.		34	× 9	× 2	=	2,448	0		
Ditto, 2 Do.		94	× 12	× 2	=	4,512	0		
Ditto, 6 Do. . .		85	× 20	× 2	=	20,400	0		
Foundation of 6 walls under Do. .. each, .		85	× 3½	× 2	=	3,570	0		
Ditto, 6 walls as above, .. .		85	× 2½	× 7	=	8,925	0		
Floor of 2 rooms, .. .		30	× 20	× 2	=	2,400	0		
Foundation of 2 walls, .		30	× 3½	× 2		420	0		
Ditto, 2 walls above, ...		30	× 2½	× 7	=	1,050	0		
Floor of 1 room, ...		40	× 30	× 2	=	2,400	0		
Foundation of 2 walls, .	40 =	80	× 3½	× 2	=	560	0		
Ditto, 2 walls above,	40 =	80	× 2½	× 7	=	1,400	0		
						51,253	0	@ 14/ ,oo	7,175 6 9
Carried over, ...									20,229 3 6

No. II. c.(1)—(*Continued.*)

Brought forward,									20,229	3	6
Superstructure.											
Lower Story, 30 walls,	1,488 × 2 × 23½ =	69,936	0								
Ditto, 3 Do.	116 × 2½ × 23½ =	6,815	0								
Ditto, 1 Do.	30 × 0½ × 23½	352	6								
Ditto, between Pillars,	18 × 2 × 23½	846	0								
Ditto, 1 Backstairs each,	1,809	7,236	0								
Masonry over the Architrave of Carriage Porch,	31 × 2½ × 3½ =	271	3								
		85,456	9	@ 11/	/oo	11,963	15	0			
2 Circular Pillars in Porch, each 19¼ feet and 3 feet in diameter,		38	6	@ 3/		115	8	0			
2 Pilasters each 19¼ feet,		38	6	@ /8		19	4	0			
Roofing, including Wood Work.											
6 Rooms each,	85 × 20 × 1 =	10,200	0								
2 Ditto,	31 × 20 × 1	1,240	0								
8 Ditto,	9 × 9 × 1	648	0								
1 Ditto,	35 × 31 × 1	1,085	0								
		13,173	0	@ 10/	oo	5,269	3	3			
Drains round the Building,	386 × 1 × 1 =	1,544	0	@ 14/	oo	216	2	6			
Roads in Portico,	35 × 31 × 0 =	1,085	0	@ 7		75	15	0			
Chunar stones over step,		961	0	@ 10		600	10	0			
Upper Story.											
30 Walls,	1,488 × 1½ × 25½ =	56,916	0								
3 Ditto,	116 × 2 × 25½ =	5,916	0								
1 Ditto,	30 × 0½ × 25½	382	6								
Masonry between Pillars to Rooms over Porch,	18 × 1½ × 25½	688	6								
2 Brick Backstairs to roof each, 1,377		2,754	0								
Masonry over the Architrave of Verandah pillars,	325 × 4 × 8 =	10,400	0								
Ditto ditto in Rooms,	31 × 2 × 4 =	248	0								
Parapet,	386 × 1½ × 2½	1,447	6								
Pediment on south-side,	103½ × 1½ × 7¾	1,203	2¼								
Ditto 2 ends, each 49 feet,	98 × 1½ × 5	735	0								
		80,690	8¼	@ 15	oo	12,103	9	6			
Inside Cornice, Staircase and Committee Room,		252	0	@ /8		126	0	0			
Outside Cornice,		386	0	@ 1/		386	0	0			
30 Circular Pillars of 40 feet and 5 feet in diameter,		1,200	0	@ 5/		6,000	0	0			
2 Ditto each 209 feet, and 2½ ditto,		41	6	@ 3/		124	8	0			
Roofing, including Wood Work.											
1 of	187 × 111½ × 1 =	20,850	6								
2 of	207 × 8 × 1 =	1,656	0								
2 of	98 × 8 × 1 =	784	0								
1 of	35 × 31 × 1 =	1,085	0								
		24,375	6	@ 40/		9,750	3	0			
Capitals for 30 Pillars of Verandahs,				@ 16/		480	0	0			
									67,460	1	9
Carried over,									67,460	1	9

No. II. *c.*—*(Continued.)*

Item	Dimensions	Quantity	Rate	Amount	Total	Grand Total
Brought forward,						67,460 1 9
Wood Work on Lower Story.						
55 Pairs of Teak wood Venetians with Saul wood door-frames each,	13-0 × 5-0	3,575 0				
19 Pairs of panel doors with door-frames each,	13-3 × 5-0	1,258 9				
25 Ditto in Staircase and Apothecaries' rooms,	13-3 × 5-0	1,656 3				
8 Ditto in Backstair,	7-0 × 3-6	196 0				
		6,686 0	@ 1/	6,686 0 0		
1 Saul wood Architrave over Carriage Pillars,		34 0	@ 3/	102 0 0		
Cast Iron Rails for Verandah, Upper Story,		140 0	@ 6/	840 0 0		
Saul wood double Architrave over Verandah Pillars,		347 0	@ 5/	1,735 0 0		
Ditto in Porch Room Upper Story,		35 0	@ 3/	105 0 0		
55 Pairs of Teak wood Venetians with Saul wood door-frame,	13-0 × 5-0	3,575 0				
41 Ditto Panel Doors, ditto ditto,	13-3 × 5-0	2,915 0				
6 Ditto ditto ditto,	7-0 × 3-6	147 0				
7 Ditto Venetians for Committee Room each,	13-0 × 5-0	455 0				
		7,092 0	@ 1/	7,092 0 0		
7 Ditto Sashes,	12-6 × 4-6	393 9	@ /12	295 5 0		
1 Teak wood Stair, 8 feet and 6 feet wide to 2nd floor,				2,000 0 0		
2 Paladian Windows for Committee Room each,	13-0 × 12-0	312 0	@ 1/1	390 0 0		
2 Sashes for ditto,	12-6 × 11-6	287 6	@ /12	215 10 0		
2 Lightening Conductors,			@ 75/	150 0 0		
Teak wood Floor.						
9 Saul wood Beams, each 12 feet, 108 feet,			@ /12	81 0 0		
Teak wood Boarded Floor,	34-0 × 9-0 = 306		@ /12	229 8 0		
Cast-iron Railing over ditto,	4-6		@ 6/	27 0 0		
Teak wood Panelling under ditto,	306		@ /12	229 8 0		
				567 0 0		
Three more [Teak wood Floors,] same as the one above,			@ 567/	1,701 0 0	2,268 0 0	
Gallery.						
4 Iron Brackets,			@ 20/	80 0 0		
Saul wood Architrave,				29 0 0		
9 Ditto Beams each,	$5\frac{1}{2}$ = 496		@ /8	24 12 0		
Teak wood Boarded Floor,	29-0 × $4\frac{1}{2}$ = $130\frac{1}{2}$		@ /12	97 14 0		
Ditto Panelling under ditto,	$130\frac{1}{2}$		@ /12	97 14 0		
Cast-iron Ornamental Railing,	29		@ 6/	174 0 0		
				503 8 0		
Other three similar,			@ 503/8	1,510 8 0	2,014 0 0	
Communication to Room over the Porch.						
4 Saul wood Architraves each,	8 = 72		@ 2/	144 0 0		
3 Ditto Beams,	34 = 102		@ /12	76 8 0		
Teak wood Boarded Floor,	34-0 × 15-3 = 510		@ /12	382 8 0		
Panelling under ditto,	510		@ /12	382 8 0		
Cast-iron Ornamental Railing,	9		@ 6/	54 0 0	1,039 8 0	
47 Pairs of Teak wood Batten doors each,	7-0 × 3-6 = $1,151\frac{1}{2}$		@ /10		719 11 0	
						25,652 2 0
Total Co's. Rupees,						93,112 3 9

CALCUTTA :
24th January, 1845.

(Signed) BURN & Co.

No. III.

J. MORRIS, Esq.,
Clerk to the Municipal Committee.

Dear Sir,

The enclosed are the notes which I have made on the Plans for a Fever Hospital respectively, with reference to my own.

Further explanation can be afforded of a much more satisfactory nature at the Meeting, which I shall be happy to attend and submit my Estimates on receiving notice of the same.

Your's faithfully,

14th February. *(Signed)* H. GOODWYN.

No. III. *a.*

Mr. PARKER'S PLANS.

Mr. Parker's Plan No. 1, I imagine to be out of the question : its amount being 1½ lacs without the adaptation of water-works, or other necessary works.

So I will consider No. 2 by the same, the Roofs are wholly timber.

No provision is made against the rise of the damp to the Basement Floor beyond the height allowed, which is not enough to prevent the Lower Story from being affected.

No provision is made for supply of water to the Wards or Dispensary.

The Examination Room is deficient in space, the Council having specified " a Spacious Room." Mr. Parker's Plan gives 324 superficial feet of area for the above purpose and no room for the Surgeon attending the Hospital, enjoined by the Council as a necessary part of the Plan.

Mr. Parker's Dispensary has 568 feet of area.

And a single room of small dimensions for Apothecary. The Council required Room for two Clinical Clerks.

Mr. Parker's Lower Story under the Beams is 19 feet and the Upper 21.

I see no provision made for stair access to the Basement Floor from level of ground.

Notes.

In my Estimate I have allowed for the support of the whole floor on cast-iron girders and the Upper Story roofed with wrought-iron trusses, the difference between which and the timber roof would be 7,000 Rupees.

My Estimate provides for a complete floor of Asphaltic Mastic, at an expense of 7,800 Rupees *extra.*

I have included in my Estimate the cost of pipes, pumps and cisterns for both stories at an expense of 11,600 Rupees.

My Examination Room is double the above area, or 648 superficial feet, with 450 feet of area for the Surgeon's Private Room.

My Dispensary is 648 interior space, and there are two Rooms of accommodation for 2 Clinical Clerks.

My Basement Floor is 22 feet under Beams, and the Upper 21 feet, with the additional ventilation from the slope of the Trussed Iron Roof.

(Signed) H. GOODWYN.

No. III. *b*.

BURN AND CO'S PLAN

The Council specified that the Wards should not contain more than 20 Patients each. This Plan provides Wards for 28 each, thorough ventilation throughout not obtainable by this Plan from the situation of the Staircase, Apothecaries' Rooms, and Dispensary in the very centre, not a desirable arrangement.

Bath and Privy accommodation insufficient.

In each story provision is made for 168 Patients, and for whom their is only 324 superficial feet of Bath, and the same of Privy Room: access to the Privies is only through the end Ward, which is objectionable; there should be access for Patients by the Verandahs, and the Wards independently.

There is no specified Surgeon's Room or Dispensary, though the Rooms marked as "Apothecaries'" might be so appropriated.

Verandahs in many places are much too narrow, being only 9 feet wide.

No provision made for preventing damp floors to Basement Story beyond the height, which in Bengal does not offer impediment to the rise.

The whole of the floors and roofs are of timber.

No provision made for raising or supplying water, which for this extent of building, would cost 16,000 Rupees.

The rates for Masonry are too low I think for security.

Burn & Co.'s Estimate as follows:

Vaulting and superstructure of Lower Story at	14
Upper Story	15

Estimating Masonry at my rates, would make a difference of 7,000 Rs.

Notes.

15 beds accommodated in my Plan in each Ward, 60 superficial feet for each Patient.

In my Plan, for 126 Patients on Lower Story, there is 792 superficial feet of Privy Room, and 1,008 of Bath, with access to both from spacious Verandahs.

The whole of the Verandahs in my Plan are 16 feet wide.

Asphalte throughout Basement Floor provided in my Estimate at an expense of 7,800 Rupees.

My Basement Floor is carried on cast-iron girders with vaulted intervals, and the upper roof wrought-iron trussed, with increased space for ventilation. Extra cost over timber being 7,000 Rupees.

Pipes, pumps and cisterns provided for by me at a cost of 11,600 Rupees for both stories.

My rates for vaulting, ...	16
Superstructure Lower Story, ..	15
Upper Story, ...	18

And these are moderate,

There are, besides, nearly 5000 added to my Estimate for Contingencies.

(Signed) H. GOODWYN.

No. IV.

Extract—Proceedings of the Committee upon the Fever Hospital and Municipal Improvements, Friday, 28th February, 1845.

IN CIRCULATION.

To THE MEMBERS OF THE COMMITTEE UPON THE FEVER HOSPITAL AND MUNICIPAL IMPROVEMENTS.

The Chairman has the honour to circulate the Resolutions come to by the very small number of the Members of the Committee assembled this day, being only himself and Mr Grant. It appeared to these Members to be necessary before proceeding finally to dispose of the Fund in the hands of the Committee, to circulate the Resolutions in order to obtain, as they hope, the approbation of the several absent Members of the Committee.

The Members present were of opinion that this specific undertaking by the Government of Bengal, to provide attendance and necessaries for the patients, which the Hospital to be erected from the Fund in the hands of the Committee may be capable of containing, and the circumstance of the benevolent and generous grant of Land by Baboo Muttyloll Seal, which leave the whole of the Fund at the disposal of the Committee applicable to the expense of Building only, place it without question, that, this is the most advantageous application of the Fund, with the view of carrying into effect the benevolent purposes of the Subscribers, and which therefore justify the Committee in applying it to the making an addition to the Hospital of the Medical College, rather than to the Native Hospital, to which, if the origin of the Subscription alone were considered, it would no doubt appear more natural to have appropriated it. The correspondence with the Medical College and the Secretary of the Native Hospital is herewith appended.

MUNICIPAL OFFICE, TOWN HALL:
6th August, 1844.

J. P. GRANT,
Chairman

No. IV. *a.*

To THE HONORABLE SIR J. P. GRANT KT

MY DEAR SIR, *Medical College, 25th October* 1843.

I have been told that you are President of the late Fever Hospital Committee, and that certain Funds belonging to that association are now lying idle. We are very much in want of a large Native Hospital at the Medical College, situated in the centre of the Native Town, and from the limited size of our present Hospital, are compelled to send away a large number of applicants suffering from Fever, Dysentery, and a variety of other severe and dangerous maladies. It has struck me that the design of the Fever Hospital Committee could be easily carried out, in the original spirit of those who subscribed towards the raising of the requisite funds . if you would therefore kindly permit me to wait upon you any morning

(except to-morrow) most convenient to yourself, I would do myself the honor of explaining these matters more in detail than can readily be done upon paper, and hope that I should succeed in proving to you the great want still existing in the Native Town, of such an establishment, for the treatment of Fever and other dangerous maladies. Trusting that you will pardon my thus intruding upon you.

I remain,
My dear Sir,
Very faithfully Your's,
(Signed) FRED. J. MOUAT.

No. IV. *b.*

No. 1036.

To F. J. MOUAT, Esq.,
Secretary Medical College.

SIR,

With reference to your communication to me, of the 25th October 1843, stating that the Medical College are very much in want of a large Native Hospital, and that from the limited size of the present Medical College Hospital, that the officers of that Institution are compelled to send away a large number of applicants, suffering from Fever, Dysentery, and a variety of other severe and dangerous maladies, and that it has struck you that the design of the Fever Hospital Committee could be easily carried out in the original spirit of those who subscribed towards the raising of the requisite Funds, and requesting permission to wait upon me to explain the above matters more in detail, I have the honor to state, that the Fever Hospital Committee keeping in view their Report of the 7th December 1840, thought fit before entertaining any proposition for the disposal of the Funds in their hands, to ascertain from the Government their intention relative to the contribution the Government was disposed to make in aid of the private subscriptions obtained for the establishment of a Fever Hospital.

The answer of the Secretary to Government states that the Government might under more favourable circumstances have probably fulfilled the intention expressed of affording under certain conditions, the aid which might be required for the first foundation of the Fever Hospital, but that with reference to the present financial considerations, the Deputy Governour regrets that Government cannot incur any unavoidable expense, and such as may be defrayed by the Calcutta Community, and expresses the wish of His Honour, that the Funds of the Committee may be expended in such a way as they may deem most calculated to meet the views of the subscribers.

The Committee have also received from the Governours of the Native Hospital, an application of the same nature with yours, and are therefore desirous of ascertaining whether, if the money at their disposal were expended in the erection of a large Native Hospital or Fever Ward adjoining the Medical College, the Officers of that Institution would undertake to afford to the Patients, which such Ward might be capable of receiving, the requisite supplies of Provisions and Medicines, Medical and other attendance, necessary to their treatment.

I have the honour to be,
Sir,
Your most obedient Servant,
(Signed) J. P. GRANT,
Chairman of the Committee.

MUNICIPAL OFFICE, TOWN HALL
The 26th April, 1844.

No. IV. *c*.

No. 220.

To THE HONORABLE SIR J. P. GRANT, Kt.,

President, Fever Hospital Committee.

Honorable Sir,

I am directed to acknowledge the receipt of your Letter No. 1056, dated 26th April, respecting the establishment of a Fever Hospital or Ward attached to the Medical College, and in reply have the honor to inform you that the Medical Officers of the Institution will gladly afford every aid and attendance to the Patients of the Fever Hospital, and furnish it with clinical clerks, dressers and every description of Medical attendants, there being a House Surgeon and Resident Professor living in the College, and always prepared to afford assistance at any hour of the day or night.

With respect to the supply of Medicines and diet to the patients, the Council have not the power of granting them without a special reference to Government, which has been sent in, and the reply to which will be forwarded for your information, as soon as it reaches this Office.

The situation of the Medical College in the very centre of the Native Town, and the ample means possessed by it for affording constant and efficient assistance to the sick, renders it in the opinion of the Council, the most eligible locality for the establishment of a Fever Hospital; and in addition to this, the great advantages which it would afford to the Students of the Institution, in becoming familiar with the treatment of such fatal and formidable diseases, could not fail ultimately to be of much importance to the Native population at large, amongst whom they will have hereafter to practice, and introduce the blessings of European science and skill in the treatment of disease.

I have the honor to be,

Honorable Sir,

Your most obedient Servant,

(*Signed*) FRED. J. MOUAT, M. D.

Council of Education:
The 8th May, 1844.

No. IV. *d*.

No. 343.

SIR J. P. GRANT, Kt.,

President to the Fever Hospital Committee.

Honorable Sir

I have the honor, by direction of the Council of Education, to forward for your information the enclosed copy of a letter just received from the Under-Secretary to the Government of Bengal, stating that if the Funds now in the hands of the Fever Hospital Committee be expended in building a Hospital adjoining the Medical College, His Honor the Governor of Bengal will provide medicines and establishment for the same at the public expense.

I have the honor to be,

Honorable Sir,

Your most obedient Servant,

(*Signed*) FRED. J. MOUAT, M. D.,

Secretary.

Council of Education:
The 11th July, 1844.

No. IV. *d.*[1]

No. 487.

FROM THE UNDER-SECRETARY TO THE GOVERNMENT OF BENGAL,

To THE SECRETARY TO THE COUNCIL OF EDUCATION.

SIR, *Dated Fort William : 8th July,* 1844.

With reference to your Letter No. 219, dated the 18th May last, I am directed by the Honorable the Governor to inform you, that if the money now in the hands of the Fever Hospital Committee, be expended in the erection of a large Native Hospital, adjoining the Medical College, His Honor will undertake to provide at the Public charge such Establishment and Medicines as may be necessary for the support of the Institution.

I have &c.,
(Signed) C. BEADON,
Under-Secretary to the Government of Bengal.

(True Copy.)
(Signed) FRED. J. MOUAT, M. D.,
Secretary Council of Education.

No. IV. *e.*

No. 400.

To THE HONORABLE SIR J. P. GRANT, KT.,
President Fever Hospital Committee

HONORABLE SIR,

In continuation of my Letter No. 343, dated 11th July, I have the honor by direction of the Council of Education to inform you, that Baboo Mutty Loll Seal has munificently presented to the Medical College, the slip of ground, extending from the East Gate of the College to College Street as a site for the proposed Fever Hospital, should the Funds for its erection be placed at the disposal of the College.

2nd. The value of this gift, with the generous and liberal spirit in which it has been bestowed, lead the Council to hope, that it will be an additional inducement to the Fever Hospital Committee to confer so great a boon upon the poorer inhabitants of this City, and upon an institution which has already been the instrument of much good, and whose power of conferring benefit will be considerably increased by the addition, to its present instructive establishment, of a Fever Hospital.

I have the honor to be,
Honorable Sir,
Your most obedient Servant,
(Signed) FRED J. MOUAT, M. D.,
Secretary

COUNCIL OF EDUCATION :
The 6th August, 1844.

No. IV. *f.*

No. 1086.

To F. J. MOUAT, M. D.,

Secretary to the Council of Education.

SIR,

I have the honour to transmit to you Copy of the Resolutions agreed to by the Committee upon the Fever Hospital and Municipal Improvements on this day, before whom I have laid your several Letters. So soon as the Plan is finally approved by the Council of Education and Municipal Committee, the Funds at the credit of the latter in the hands of the Union Bank, will be made applicable from time to time, to defray the expense of the building in such manner as shall be thought most expedient

Letter dated 25th Oct. 1843.
,, ,, 8th May, 1844.
,, ,, 7th June, 1844.
,, ,, 11th July, 1844.
,, ,, 6th Aug. 1844.

I have the honour to be,
Sir,
Your most obedient Servant,
(*Signed*) J. P. GRANT,
Chairman of the Committee.

MUNICIPAL OFFICE, TOWN HALL,
6th August, 1844.

No. IV. *f.* (1)

Extract—Proceedings of the Committee upon the Fever Hospital and Municipal Improvements—Tuesday, the 6th August, 1844.

1 Resolved—That the sum at the disposal of the Committee, amounting on the 1st July 1844, to Rs. 55,462 : 10 : 3, together with such further sums as may be collected, of the Subscriptions not yet paid in, amounting in all to Rupees 6,675 : 7 : 9, be appropriated to the erection of a Fever Hospital, on the ground, mentioned in the Letter under yesterday's date, to the Chairman from the Secretary to the Council of Education, given with so much liberality and beneficence as a site for the proposed Fever Hospital, adjoining the Medical College, by Baboo Mutty Loll Seal.

2. Resolved—That the Chairman be requested to send the above Resolution in circulation to the several absent Members of the Committee, with a request that they will signify their approbation of the same in writing, and that the Chairman do communicate to the absent Members, the summary of the reasons which have induced the Members of the Committee present, to come to the above Resolution.

3. Resolved—That a Copy of these Resolutions be transmitted to the Secretary to the Council of Education, with a Copy of the Plan and Estimate of the Fever Hospital, framed by Major Fitzgerald, and contained in Appendix F. pages 177 to 180.

4 Resolved—That the Council of Education be requested to communicate with Major Fitzgerald on the subject of adopting the Plan, proposed by him for the large Hospital then contemplated, to the diminished Fund, which it is now in the power of the Committee, to appropriate to that object, keeping in view the possibility of the Committee being enabled by means of future subscriptions, to enlarge the building—and that the Council of Education be requested to communicate to the Chairman of this Committee, the result of their communication with Major Fitzgerald.

(A true Extract.)
(*Signed*) J. P. GRANT,
Chairman.

No. IV. *g*.

No. 1057.

To R. STUART, M. D.,

Secretary Native Hospital.

SIR,

With reference to your Letter to my address, of the 21st March 1843, transmitting a Resolution passed by the Governours at the Native Hospital, requesting me to ascertain whether it would be consistent with the views of the Fever Hospital Committee, to apply the Funds in their hands for the erection of a Fever Hospital, to the erection of a Fever Ward attached to the Native Hospital, and my reply of the 23rd of that month, and the letter of the Clerk to the Committee, dated 7th April 1843, to your address, in which was transmitted Copy of a Resolution passed by the Committee at a Meeting held by them on the 5th April 1843, I have the honor to inform you, that the Committee submitted to the Deputy Governour of Bengal, the proposition of the Governours of the Native Hospital.

The answer of the Secretary to the Government, dated the 10th May 1843, states, that the Government might under more favourable circumstances have probably fulfilled the intention expressed of affording under certain conditions the aid, which might be required for the first foundation of the Fever Hospital, but that with reference to the present financial considerations, the Deputy Governour regrets that Government cannot incur any avoidable expense, and such as may be defrayed by the Calcutta community, and expresses the wish of His Honour, that the Funds of the Committee may be expended in such way as they may deem most calculated to meet the views of the Subscribers

The Committee have also received an application from the Medical College, an application similar to that from the Governours of the Native Hospital, and, in order to enable them to decide upon the disposal of the Funds in their hands, so as to meet as far as possible, the views of the Subscribers, are desirous of ascertaining whether if the money at their disposal, were expended in the erection of a Fever Ward adjoining the Native Hospital, the Governours of that Institution would undertake to afford to the patients which such Ward might be capable of receiving the requisite supplies of provisions and medicines, Medical and other attendance, necessary to their treatment.

I have the honour to be,
Sir,
Your most obedient Servant,
(*Signed*) J. P. GRANT,
Chairman of the Committee

MUNICIPAL OFFICE, TOWN HALL:
26th April, 1844

No. IV. *h*.

To THE HONORABLE SIR JOHN P. GRANT,

Chairman of the Fever Hospital and Municipal Improvements Committee,
&c. &c. &c.

HONORABLE SIR,

I have the honour to acknowledge the receipt of your Letter dated 26th April 1844, in which, with reference to a Letter from the Governors of the Native Hospital, dated the 21st March 1843, requesting you to ascertain whether it would be consistent with the views of the Fever Hospital Committee to apply the funds in their hands to the erection of a Fever Ward at the Native Hospital, you state that you are now empowered by His Honour the Deputy Governor of Bengal to expend the Funds of the Fever Hospital Committee in such way as may be best calculated to meet the views of the Subscribers. You also

state that you have received from the Medical College an application similar to that from the Governors of the Native Hospital, and are now desirous of ascertaining, whether, if the money at the disposal of the Fever Hospital Committee, were expended in the erection of a Fever Ward adjoining the Native Hospital, the Governors of that Institution would undertake to afford to the patients, which such ward might be capable of receiving, the requisite supplies of provisions and medicines, Medical and other attendance necessary to their treatment.

In reply I am directed by the Governors of the Native Hospital to state that they, not being aware of the amount of Funds which the Fever Hospital Committee could place at their disposal, do not feel themselves in a position to give definite replies to the questions proposed to them. Should the amount however be sufficient for the purchase of land, building a Ward, and the other necessary charges attendant on keeping up the Ward in a state of efficiency, the Governors would with pleasure, undertake the management of such additional Ward.

I beg to apologize for the delay which has taken place in replying to your Letter, and in explanation beg to state, that after your Letter had returned from circulation, it was found necessary to re-circulate it with some additional information which the Superintendent of the Hospital was requested to furnish, moreover the subject being one of great importance, the papers were detained by some of the Governors for a longer period than usual.

I have the honour to be,
Honourable Sir,
Your obedient Servant,
R. STUART, M. D.,
Secretary Native Hospital.

CALCUTTA, NATIVE HOSPITAL,
10th June 1844.

(True Extracts.)

J. MORRIS,
Clerk to the Committee upon the Fever Hospital and Municipal Improvements

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No. V.

No. 2013.

To F. J. MOUAT, Esq.,
Secretary to the Council of Education

SIR,

I am directed by the Honorable Sir J. P. Grant, Chairman of the Committee upon the Fever Hospital and Municipal Inprovements, to request you to be so good as to furnish the Committee with the amount of subscriptions obtained, and further contributions from Government, or otherwise, which may be expected in addition to the Fund in the Committee's hands, to enable him to lay before the Meeting, to be held on Friday next, the 28th instant, at 5 P. M., an account of the means available for the erection of the proposed Fever Hospital.

I have the honor to be,
Sir,
Your most obedient Servant,
(*Signed*) J. MORRIS.
Clerk to the Committee

MUNICIPAL OFFICE, TOWN HALL:
26th February, 1845.

No. VI.

No. 1163

Mr. J. MORRIS.

Clerk to the Municipal and Fever Hospital Committee.

Sir,

In reply to your Letter of the 26th instant, I beg to state for the information of the Municipal Committee, that the amount subscribed for the proposed Fever Hospital, is 19,055 : 5 : 0,* and that I expect further contributions from private sources, but am not prepared to state what further assistance may be expected from Government, as this will depend in a great measure upon the Plan adopted by the Fever Hospital Committee, and its applicability to the demands which exist for extended accommodations in Epidemic outbreaks of the disease.

* Now amounting to about Rs 40,000, April 1847.—J. M.

I have the honor to be,
Sir,
Your obedient Servant,
FRED. J. MOUAT, M. D.,
Secretary

Council of Education :
28th February, 1845

No. VII.

No 2014.

To F. J. MOUAT, M. D.,

Secretary to the Council of Education

Sir,

I am directed by the Honorable Sir J. P Grant, the Chairman of the Committee upon the Fever Hospital and Municipal Improvements, to transmit to you the annexed Resolutions passed by the Committee, at their Meeting on the 28th ultimo

I have the honor to be
Sir,
Your most obedient Servant,
(Signed) J MORRIS,
Clerk to the Committee

Municipal Office, Town Hall :
10th March, 1845

No. VII. *a.*

Extract—Proceedings of the Committee upon the Fever Hospital and Municipal Improvements—Friday, the 28th February, 1845.

The Clerk of the Committee submits a statement of the Fever Hospital Funds, up to the 31st December 1844, amounting to Co's. Rupees 56,339 : 2 : 0 net, which, with the Rupees 19,055, subscriptions obtained by the Council of Education, makes an aggregate sum of Rupees* 75,394 : 2 : 0, available for the erection of the proposed Fever Hospital.

* Now amounting to upwards of one Lakh of Rupees, April 1847 — J M.

The Chairman brings to the notice of the Committee, that the Council of Education were requested by the 4th Resolution of the Committee, of the 6th August 1844, "to communicate with Major Fitzgerald on the subject of adopting the Plan proposed by him, for the large Hospital then contemplated, to the diminished Fund which it is now in the power of the Committee to appropriate to that object, keeping in view the possibility of the Committee,

being enabled by means of future subscriptions to enlarge the building, and that the Council of Education be requested to communicate to the Chairman of this Committee, the result of their communication with Major Fitzgerald"—that a Plan by Captain Goodwyn, who has succeeded Major Fitzgerald, has been drawn at the desire of the Council of Education, and in communication with the Members of the Medical College, and has been received and circulated among the Members of the Committee by the Chairman, which is now upon the table, that he has also received from Dr. Strong, with the concurrence as he understands of the Secretary of the Council of Education, Plans of a Fever Hospital by Messrs. Burn and Co. and Mr. Parker, which he had submitted to Captain Goodwyn for his remarks, which remarks he had received and now submits with the said Plans to the Committee.

1st. Resolution—That this Committee approve of the Plan of a Fever Hospital by Captain Goodwyn, and if the Council of Education are prepared to adopt and will undertake the execution of the said Plan, with such curtailment as they and Captain Goodwyn may think expedient, with reference to the means at present available for the erection of such building, and to such further contribution from Government, or otherwise, as the Council of Education may, upon their own responsibility, consider themselves safe to reckon upon, the whole of the Funds in the Committee's hands, shall be at the disposal of the Council to be paid to them from time to time as the progress of the work requires.

2nd. Resolution—That a copy of the above Resolution and its preamble be transmitted to the Council of Education.

(A true Extract.)

(Signed) J. MORRIS,
Clerk to the Committee.

No. VIII.

IN CIRCULATION.

TO THE MEMBERS OF THE COMMITTEE UPON THE FEVER HOSPITAL AND MUNICIPAL IMPROVEMENTS.

The Chairman has the pleasure to circulate the answer, which he received from Doctor Mouat, Secretary to the Council of Education, to the Chairman's Letter to him of the 16th ultimo, of which Letter a Copy is herewith sent. The Chairman congratulates the Committee upon the progress that appears to have been made in carrying into execution the Plan, so long since one of the great objects of the Committee, for the Establishment of a Fever Hospital under the immediate patronage of the Government of Bengal, with an undertaking so creditable to the present Government to maintain and support such Hospital in connection with the Medical College.

The Chairman requests the permission of the Committee, if they agree with him in approving of this measure, to make over the Funds now in the Union Bank, at the disposal of the Committee for the purpose of erecting a Fever Hospital, to the Council of Education, in trust for the purposes and with the guarantee mentioned in Dr. Mouat's Letter, especially stipulating that the Funds made over by this Committee to the Council of Education, shall be vested in Government Security.

The Chairman has the honour, by permission of Major Goodwyn and of the Council of Education, to circulate among the Members, Major Goodwyn's Design for the exterior and Plan for the interior of the proposed buildings, which he has no doubt will be highly approved by the Committee.

The Committee will observe that the Wards of the proposed Fever Hospital, are calculated to receive 350 patients at a time, capable at the average of 12 days for the duration

of treatment, in cases usually received in a Fever Hospital, of receiving in the course of a year about 10,500 patients.

It is explained to the Chairman that the lower story, is proposed to be vaulted for the circulation of air, and that the lowest Wards, for the reception of patients, will be 10 feet above the ground.

The expense of this Fever Hospital is estimated, at a trifle above one Lac of Rupees, which sum is already collected.

The Chairman particularly requests, that great care may be taken of the Plan, which he believes is the only Copy in existence.

MUNICIPAL OFFICE, TOWN HALL:
1st April, 1847.

No. VIII. *a*.

No. 4001.

To F. J. MOUAT, Esq.,
Secretary to the Medical College and Council of Education.

SIR,

I beg to call your attention to my letters of the 26th April 1844, 30th May 1844, 6th August 1844, and 10th March 1845, relative to the placing at the disposal of the Council of Education the Funds in our hands for the purpose of erecting a Fever Hospital or Ward contiguous to the Medical College Hospital.

The Council of Education are aware that no answer has yet been received by our Committee, to enable us to make over the sum in our hands to the Council, for a purpose which it appears so desirable to carry into execution, without further delay.

If I do not receive such answer as may enable the Committee to do so, I shall take the opinion of the Committee upon the propriety of vesting in Government Security, the sum now in the Union Bank, amounting to Rupees 60,313 : 14 : 2.

I have the honour to be,
Sir,
Your most obedient Servant,
(*Signed*) J. P. GRANT,
Chairman of the Committee for establishing a Fever Hospital.

MUNICIPAL OFFICE, TOWN HALL.
16th March, 1847.

No. VIII. *b*.

No. 437.

FROM THE SECRETARY COUNCIL OF EDUCATION.

To THE HONORABLE SIR J. P. GRANT, KT.,
Chairman of the Committee for the Establishment of a Fever Hospital.

HONORABLE SIR,

In reply to your Letter No. 4001, dated 16th March 1847, I have the honor by direction of the Council of Education, to state briefly the causes which have heretofore prevented the returning of a definite reply to your Letters noted in the margin.

26th April, 1844.
30th May, 1844.
6th August, 1844.
10th March, 1845.

You are aware from the correspondence which has already taken place upon the subject, that the Government has undertaken to maintain and support the Fever Hospital, in con-

nection with the Medical College, if the Funds in the possession of your Committee are devoted to that purpose.

The great expense of ground in the immediate vicinity of the Medical College, together with other circumstances connected with the expediency of increasing and removing that Institution to a more favorable locality, have caused the building of the Fever Hospital, to merge in the general question of constructing an entirly new Medical College, for which a very beautiful design has been furnished by Major Goodwyn, which I am permitted by that Officer to forward for the information and inspection of your Committee. In it provision has not only been made for a special Fever Hospital, but for a Male and Female General Hospital, &c. &c.

The whole of this question being at present under the consideration of Government, the Council are not in a position to return a definite reply to your communication at present.

The Funds recently collected by the Council of Education for building a Fever Hospital, amount already to Co's. Rs. 40,000, of which sum Rs. 2,472 were realized during the past year by interest from judicious investment—the greater part being now invested in Government Security. Should your Committee be disposed to make over in trust to the Council the Funds now in the Union Bank (Rs. 60,313 : 14 : 2), they will be happy to secure them in a similarly productive manner, and to guarantee not only that they shall be strictly devoted to the purposes for which they were collected, and that the structure shall be ornamental to the City, as well as constructed with every modern improvement advisable and practicable, but that the Council will spare no effort in their power, to cause the design to be carried into effect as early as possible—since they fully coincide in your opinion, as to the necessity of avoiding delay in adding so important and much needed an Institution to the existing means of relieving sickness and diminishing mortality in this great City.

I beg leave to solicit, that Major Goodwyn's Plan may be circulated with great care, and returned when no longer required.

I have the honour to be,
Honorable Sir,
Your most obedient Servant,
F. J. MOUAT, M. D.,
Secretary Council of Education.

FORT WILLIAM :
30th March, 1847

No. IX.

No. 4018.

To H. W. ABBOTT, Esq.,
Secretary to the Union Bank.

SIR,

I am requested by the Fever Hospital Committee, of which I have the honour to be the Chairman, to direct you to transfer, or pay over the Funds now in the Union Bank, to the Council of Education, on its application to you for those Funds, within any period thirty days after the date of this notice.

The circumstances which have led to this arrangement, you will see stated in the enclosed Copy of correspondence,* with which I am requested to furnish you for your information.

I have the honour to be,
Sir,
Your most obedient Servant,
(*Signed*) J. P. GRANT,
Chairman of the Committee upon the Fever Hospital and Municipal Improvements.

MUNICIPAL OFFICE, TOWN HALL :
14th April, 1847.

* Letter No. 437, from F. J. Mouat, Esq., dated 30th March 1847, to the Honourable Sir J. P. Grant.
Letter from the Honourable Sir J. P. Grant, dated 10th March 1847, to F. J. Mouat, Esq., Secretary to the Council of Education.

No. X.

No. 4017.

To F. J. MOUAT, Esq.,

Secretary to the Council of Education.

Sir,

I have the honour to acknowledge the receipt of your Letter No. 437, dated 30th ultimo, stating briefly the causes which have hitherto prevented your returning a definite reply to my several communications to you upon the subject of the transfer of the Fever Hospital Funds, in the Committee's possession, to the Council of Education.

On the receipt of your above communication, I submitted it to the Committee, who, under the assurance of the Government having undertaken to maintain and support the Fever Hospital in connection with the Medical College, if the Funds in the possession of our Committee are devoted to that purpose, and the guarantee of the Council of Education that the Fever Hospital Funds at present in our possession, shall be strictly devoted to the purposes for which they were collected (viz. the erection and maintenance of a Fever Hospital), and that the structure shall be ornamental to the City as well as constructed with every modern improvement advisable and practicable, and that the Council will spare no effort in their power, to cause the design to be carried into effect as early as possible, agree with me in approving of the transfer of the Fever Hospital Funds in our possession and now lying in the Union Bank, to the Council of Education, in trust for the above purpose, but with the stipulation that those Funds be vested in Government Security, till they are required for the purposes of erecting the proposed Fever Hospital.

The Secretary of the Union Bank will accordingly be directed to make over, thirty days after the date of this Letter, the Fever Hospital Funds to the Council of Education on its application to the Union Bank; and the Clerk to the Committee will furnish you with the Fever Hospital Union Bank Book, together with the receipts of the uncollected Subscriptions.

I have the honour to return herewith in its tin case, the Plan of the proposed Fever Hospital and the new Medical College, transmitted with your Letter above cited.

I have the honour to be,
Sir,
Your most obedient Servant,
(*Signed*) J. P. GRANT,
Chairman of the Committee upon the Fever Hospital and Municipal Improvements.

Municipal Office, Town Hall:
14*th April*, 1847.

No. XI.

No. 613.

From THE SECRETARY COUNCIL OF EDUCATION,

To THE HONORABLE SIR J. P. GRANT, Kt.,

Fort William, April 23rd, 1847.

Honorable Sir,

In reply to your Letter No. 4017, dated 14th April 1847, I am directed by the Council of Education to inform you, that they will gladly accept the trust upon the terms mentioned, and spare no effort to procure a speedy and satisfactory fulfillment of the wishes of the Committee.

The Funds will be duly vested in Government Securities when realized.

I have the honor to be,
Honorable Sir,
Your most obedient Servant,
(*Signed*) FRED. J. MOUAT, M. D.,
Secretary Council of Education.

(True Copies.)
J. MORRIS,
Clerk to the Committee upon Municipal Improvements, &c.

No. XII.

No 1088.

To J. H PATTON Esq.,

Chief Magistrate of Calcutta

Sir,

I had the honour, so far back as the 25th April last, to address you by Letter, stating that I should feel much obliged, if you could, without any departure from your official duty, furnish me with a Return of the number of Deaths daily reported to the Magistrates or Superintendent of Police, by the officers of Police, during the months of January, February, and March then last, and April then instant, ending the 30th of the said instant, April, in order to enable me to comply with the desire of the Committee expressed in their Resolution, come to at their then last Meeting on Monday, the 22nd then instant, that I should address a Letter to the Government, earnestly recalling its attention to the Plans proposed in the Report of the Committee on the suggestions of Colonel Forbes and others, for the improvement of the Drainage, Ventilation, and Salubrity of the Town of Calcutta—and on the 30th May, I had the honour to recall your attention to my said Letter, to which I had not then had the honour to receive an answer, stating that that circumstance delayed my complying with the direction of the Committee.

On the 4th June, you were kind enough to acknowledge the receipt of my said two Letters, and to express your regret that the delay that had occurred in the preparation of the required statement, and your apprehension that a few days would still elapse—and on the 12th June you did me the honour to forward to me for submission to the Fever Hospital and Municipal Committee, Copy of a communication from the Superintendent of Police, of that day's date, in which he states that the Returns of Deaths in this Town, were procured at the request of Dr. Stewart, the Superintendent of Vaccine, and were then with that Gentleman, who was drawing up a Report to Government on that subject, and that he had applied to Dr. Stewart, but that Gentleman stated that he could not then spare them for a few days

Two months having since elapsed, I am induced to suppose that the matter has escaped the recollection either of the Superintendent or Dr Stewart, and I therefore take the liberty of again soliciting to be furnished, for the important purposes I have above mentioned, with this Return.*

With much regret for the necessity of intruding upon your time, so repeatedly upon this matter,

* For this Return, see Appendix (1) page 96-7, Papers marked No. 52, and No 52, a.—J M

I have the honor to be,

Sir,

Your most obedient Servant,

(*Signed*) J. P. GRANT

Chairman of the Committee upon the Fever Hospital and Municipal Improvements.

Municipal Office, Town Hall

31*st August*, 1841

No. XIII.

No 1062

Extract—Letter from the Secretary Medical College, Fort William, 17*th April* 1847, *to the Secretary Fever Hospital Committee, transmitting the Papers marked No. XIV. and No. XIV. a. to No. XIV. z z. inclusive.*

" The returns have unfortunately not all been drawn up on the same system, nor have the same periods been adopted for the beginning and end of the year. This has arisen from circumstances over which I had no control, and which it is unnecessary to detail here. The dates and details of the returns could not now be rendered uniform without a considerable loss of time, while for the purposes required, I hope they will, in their present form, be found sufficient."

No. XIV.

Queries put by the Committee upon the Fever Hospital and Municipal Improvements, to Doctor F. J. Mouat, *Secretary to the Medical College, and his Answers thereto.*

The Committee being about to report to the Government of Bengal upon the Clinical Hospital attached to the Medical College, its constitution and the actual and probable future benefits which are, and will be derived from it, request you to have the goodness to return Answers to the following Queries :—

Query. 1. It is understood, that the conduct and affairs of the Hospital are generally under your Superintendence. The Committee beg to know whether this is so, and whether, in that capacity, you are able to afford them the necessary information to enable them to frame a Report upon the above subjects ?

Answer. As Secretary to the Medical College, and resident Officer of the Institution, the control of the internal economy of all its departments, Hospitals included, is, to a certain extent, vested in me, although I have no part of the duty of treating the sick, which is exclusively performed in their several departments by the Professors of Medicine, Surgery, and Midwifery.

The records and returns are all signed by me, and with the assistance of Mr. George Daly, the House Surgeon of the Male Hospital, I am able to afford the information required.

Q 2. If they are mistaken in this supposition, they beg to know what other Gentleman they should apply to for such information, or whether, if any of the particulars do not lie within your own knowledge, you can obtain from such other person or persons the information required ?

A. This question is already partially answered above. The Professors in immediate charge of the sick, who are Gentlemen of eminence and ability, can doubtless afford much interesting and valuable information upon all matters of detail connected with their duties : but it appears to me, that the data requisite for replying to these questions, can be obtained from the published and unpublished records of the Institution, which are under my immediate charge.

Q. 3. Is the Hospital based upon the principal of a General Hospital for the reception of all Medical and Surgical cases indiscriminately ?

A. There are two Hospitals attached to the Medical College, and situated within its walls : the one for Males, the other for Females.

The former is in every essential particular a General Hospital, for the admission of medical and surgical cases indiscriminately, with the exception of small-pox and contagious diseases.

The latter is an Obstetric, as well as a General Hospital for women and children.

Q. 4. The Committee request Returns of the number of Medical cases admitted into the Hospital during the 5 years last past, distinguishing the diseases ; the duration of treatment and the result ; whether of complete cure, of partial cure, when the patient has been discharged, and whether, upon his own application or upon the opinion of the Medical Officers, that further relief could not be afforded, and of fatal termination ?

A. Tables of the diseases occurring in the Medical College Hospital, have been published, with its annual reports ever since I joined the Institution in 1841. Those of medical cases

are marked A. B. C. D. I. J. (1) which distinguish the disease, and exhibit the results, in a tabular form. The arrangement and classification of diseases from 1841 to 1845, are according to the forms adopted by the Medical Board and followed in all Regimental and Civil Hospitals in Bengal and the N. W. Provinces. Since the latter date, I have preferred those published in the Reports of the Registrar General of Births, Marriages, and Deaths in England, as not only more complete, but likewise more valuable for statistical purposes, since they will admit hereafter of accurate comparison with the laborious and detailed results referred to, and enable us to construct Tables of Mortality for this country; for which trustworthy, accurate, and sufficiently extended data do not at present exist.

(1) Marked in this Appendix as No. XIV *a.* to No. XIV. *d.* inclusive, No XIV. *i.* and No. XIV. *ii.*

The medical and surgical cases are contained in the same tables, and I have not deemed it expedient to separate them, since the name of the disease at once indicates its nature, whether medical or surgical.

The average duration of time under treatment in all cases of every nature, is given in a separate table, marked K.(2)

(2) Ditto, as No. XIV. *j.*

Table J. (3) contains a list of all diseases treated in the Male and Female Hospitals.

(3) Ditto, as No. XIV. *ii.*

Although not directly required by the query, I have also appended tables of the number of patients, Europeans and Natives, admitted during each month of the year, with the exact period in hospital of all the fatal cases, which I think will be found useful. These tables are marked L. M. N. O. P. Q. (4)

(4) Ditto, as No XIV. *k.* to No. XIV. *p* inclusive.

The great majority of the cases enumerated in the above-mentioned list, were either discharged, cured, or died. Some few left the hospital before their cure was completed, but in general, the opinion of the Medical Officer guided them.

Q. 5. A similar Return of Surgical cases, with the like particulars—*mutatis mutandis.*

A. Has been answered above, the same remarks, mutatis mutandis, applying to the surgical cases, with the exception that some patients preferred leaving the hospital to submitting to surgical operation—a proceeding which is never resorted to without the full and free consent of the sufferers or their friends. In many instances they returned, having subsequently made up their minds to submit to surgical means of cure.

Q. 6. The number and nature of Surgical operations performed, and the results?

A. The surgical operations performed and their results are contained in the tables marked R. S. T. U. V. W.(5) the two latter in their columns of remarks communicate a few particulars of the cases of most interest.

(5) Ditto, as No. XIV. *q.* to No. XIV *v.* inclusive

Q. 7. Of what religious descriptions, and of what Countries, as Native Hindoos, Mussulmans, Jews or Christians, or Natives of Europe and America, do the patients applying for relief, usually consist—distinguishing Medical from Surgical cases, and also distinguishing such as voluntarily apply, from such as are sent in by the Magistrates or the Police, in cases of wounding or poisoning?

A. Persons of all religious denominations are admitted, Hindus, Mussulmans, Jews, Armenians, Chinese, and Native Christians.

The largest and most numerous class of patients consists of European seamen from the shipping in harbour, from the Sailors' Home, and from the various lodging-houses in town, (including French, American, &c.)

The Hindus stand second in regard to number: thirdly, the Mohammedans; and lastly, Native Portuguese Christians.

This arises from the Male Hospital being separated into nearly two equal divisions, one of which is assigned to Christian, and the other to Native patients. If there were more room, the latter would be by far the most numerous.

About 75 per cent. of the Europeans, are medical cases, of Native patients the proportion of medical and surgical cases is nearly equal, this being the result of the inadequate accommodation afforded by the hospital, and not by any equality as to the relative occurrence of the two great classes of disease. There is one ward devoted to medical, and another of similar dimensions to surgical cases. I have no doubt that a much larger number of both would be admitted if the hospital could contain them, and certainly the preponderance, accommodation being adequate, would be of medical over purely surgical cases. Nearly all the admissions are voluntary applications for relief; those from accidents, wounds, poisoning, &c., sent in by the Police not being more than about five per cent or 1 in 20.

Q. 8. Do the number of applicants for Medical relief exceed what the Hospital can receive, and by what average number? and are Surgical cases received in preference to Medical ones, when there is not sufficient room for both? and has this the effect of denying relief to many, and to what usual average number of Medical cases?

A. Yes; the number of applicants for relief by far exceeds the means of accommodation afforded by the hospital, in the proportion of at least 3 to 1. The average monthly admission of Native patients is about 75, whereas even in ordinary times of sickness, I have reason to believe that at least 200 beds, if not a larger number, would be occupied.

Severe cases only are admitted, all others being treated as out-patients.

There is no preference shewn to any particular classes of cases, so long as there is sufficient room to receive them; except perhaps in regard to severe surgical cases, which are never rejected.

The plan pursued is, when beds are urgently required for severe or dangerous cases, to send out the slighter cases, medical or surgical, which have partially recovered under treatment, and treat them as out-patients, when this can be done without risk to the individual—*Cholera* cases are always received, and so are all others, when the symptoms are so urgent and dangerous as to require immediate and continued treatment

Q. 9. Does the Hospital afford relief as a Dispensary to out-door patients by supplying medicine and advice or surgical assistance, in Medical and Surgical cases, or in either?

A. To the Hospital is attached an out-door Dispensary, which affords surgical and medical relief to the extent noted in tables X. Y. Z. Z.² (6)

(6) Marked in this Appendix as No. XIV *w* to No. XIV. *z*. inclusive.

The total number of cases treated in each of the four years, during which records have been carefully kept, is as follows:—

1843	12,330
1844	10,307
1845	14,552
1846	19,203
Total,	56,392

Table Z.³ (7) contains in addition, a statement of the number of applicants for relief, during each of the months of the two last years.

(7) Ditto, No XIV. *zz*.

Q. 10. What proportion in number do the Hindoo applicants for relief in the Hospital, as in-door patients, in purely Medical cases, usually bear to the Mussulman and Christian?

A. The Hindu applicants for medical relief, are about in the proportion of 3 to 1 to Mahommedans, and of 10 to 1 to Christians.

Q. 11. Do you find many Hindoo patients reluctant to remain in the Hospital to receive in-door relief? and what precautions are taken to reconcile their receiving such relief with their

religious and customary prejudices and with what degree of success are these precautions attended ?

A. Very seldom indeed ; in fact the description of persons who have any scruples about remaining in hospital, are Up-country high caste Brahmins, and their chief objection is connected with the cooking of their food. If this is done by an orthodox member of their own caste, they at once become reconciled.

The prejudices of caste are always carefully attended to, Hindu and Mussulman cooks and water-carriers being employed for each class of patients. Natives of the highest respectability have frequently been inmates of the hospital, such as Cloth Merchants, Mahajuns, Shroffs, &c. and so long as their particular prejudices respecting the cooking of their food are attended to, they are perfectly satisfied to remain until their cure is completed.

Q 12. Are any, and what divisions, by separate wards, or partitions in the same ward, provided for the different sexes, different religions, and different castes, and for persons labouring under different afflictions, as Surgical, Medical, or Infectious ?

A The Male and Female Hospitals are distinct, but the patients of either are not separated or classed according to caste: the only division which obtains in each, being that of Medical and Surgical Wards.—Hindus and Mahomedans are placed side by side without any complaint having ever been preferred of such proximity, so long as their cooking and drinking vessels are kept separate and they are permitted to take their meals independently, both of which are always allowed.

Separate returns of the cases treated in the Female Hospital, are contained in the tables marked F. G. and H.(8)

(8) Marked in this Appendix as No XIV.*f.* to No. XIV. *h.* inclusive

Q. 13. Are the Students of the Medical College admitted to the bedside of the Patients, and in what number and under what regulations ? and are Clinical Lectures there delivered, and with what advantage to the Students ?

A. The following are the regulations under which Students of the Medical College, are admitted to the bedsides of the patients, for the purpose of performing the duties of Clinical Clerks and Dressers. The whole of the sections concerning the hospital rules are given.

SECTION XVIII.

1. The Hospital attached to the Medical College, is divided between the Professors of Surgery and Medicine. It consists of three Wards, capable of holding in all 112 beds. One Ward shall be given up entirely to each Professor, for the reception of Native Medical and Surgical cases, and the other for the European Patients be divided between them.

The Hospital shall be open for the reception of all Europeans, labouring under either severe medical disease or injury, who may apply for relief, or who may be sent in by the Police. The patients shall all be dieted according to the annexed diet roll, and the charge for the diet of each patient shall be for Europeans, four annas, and for Natives one anna per diem.

2. On the admission of a patient into hospital, he shall be sent to bed, his clothes shall be removed and taken care of, and he shall have a hospital dress of clean linen put on. He shall be immediately seen by the House Surgeon, who in cases of emergency shall prescribe, or otherwise wait until the daily visits of the Professor, which take place at half-past one o'clock, when the plan of treatment will be laid down. The disease shall be noted on a ticket, with the diet, date of admission, &c.

3. For the due observance of order and regularity in the hospital, a table of rules shall be hung up for the inspection of all the patients. The Native Patients and the European shall

receive the same degree of attention. Co.'s Rs. 500 per month, shall be allowed to cover the expenses of the Hospital.

4. The Professor of Medicine shall have six Clinical Clerks; four of whom shall be Native students and two Europeans. These shall be selected in rotation from the students. The appointment shall be held for two months by each, and during this period all the Native and European Patients should be divided equally amongst them. The names of the Clinical Clerks will be noted on the entrance to the hospital; and as each patient is admitted, he will be placed under the care of the student whose turn is next.

5. On the case being handed over to the Clinical Clerk, it wlll be his duty to take an account of the previous history, the present state of symptoms of the disease, &c. these will be noted down in his book. The treatment will then be ordered by the Professor which will likewise be written down, and from day to day as the case progresses towards recovery or fatal termination, the case is to be kept up; so that each Clinical Clerk may be furnished with a valuable practical record of each individual case, which he can refer to on after occasions, and which may serve him as a guide when he enters on his own duties, as an independent practitioner.

The history of both the Native and European cases, is to be kept in detail in the same manner, the books examined, the Clinical Clerk's statement read at the bedside on the admission of each new case, and the books will be inspected every Saturday to ascertain that the cases are carefully kept, proper attention paid to the duly entering of the treatment, and the cases being written with neatness and attention to spelling.

6. Each Student will be shewn how to conduct an examination so as to form his diagnosis, and will be questioned as to the plan of treatment, and why he proposes such and such a course. The chief symptoms from diagnosis in each case will be pointed out, and the several varieties of any one disease occurring in hospital, and calling for different plans of treatment will be shewn, and the Clinical Clerk recommended to take three or four cases of the same disease, that he may be made conversant with differences as produced by age, habit, &c.

7. When the case terminates fatally the body will be examined by the Clinical Clerk before the Professor, the morbid changes noted, and the subject will be taken into the lecture room, and shewn to the assembled pupils, who will have the opportunity of observing the whole history of the case, and have admirable means for the study of pathology and morbid anatomy. This subject will never be lost sight of; for the illustration of the lectures, morbid specimens will constantly be brought to the notice of the pupils, or the disease illustrated as fully as can be, by the representation of plates on morbid anatomy.

8. Whenever the disease is so striking as to deserve preservation, the part will be removed and handed over to the Curator, who from the written history of the disease, will be able to make the preparation valuable and instructive.

9. That the students may be acquainted with the modus operandi of medicines, they will be frequently questioned in the hospital as to the effects of remedies, their doses, and how they are prepared. They will be required to see the medicines prepared, and frequently to compound them themselves.

10. A general register of all the cases admitted into hospital shall be kept, and available for statistical purposes. A summary of the hospital cases, &c. shall be drawn up every year for the Council of Education.

11. To enable the Students to have a knowledge of vaccination, a native vaccinator will attend one day in the week, and they will have the opportunity of performing the operation themselves, and observing the true character of the Jennerian Cow-pox.

12. In concluding this notice it may be stated, that the great aim will be to make all the lectures and instructions as practical as possible, and to give the students that knowledge which will enable them to make their own enquiries with ease, to form their own diagnosis

and determine on the plan of treatmemt, without having their mind confined by nosological arrangements, or by treating a disease according to its name, rather than by the general symptoms, period of disease, habits and strength of the patient.

13. *Table of Diet for European Patients.*

BREAKFAST

Full Diet.	*Milk Diet.*	*Low Diet.*	*Spoon Diet.*
Tea ¼ ounce. Bread 1 lb Butter 1 ounce. Sugar ½ ounce (2 dr.) Milk ½ measure.	Tea ¼ ounce. Bread 1 ounce Sugar ½ ounce. Milk ½ measure.	Tea ¼ ounce. Bread 8 ounces. Sugar ½ ounce. Milk ½ measure.	Tea ¼ ounce. Sugar ½ ounce. Milk ½ measure.

DINNER.

Full Diet	*Milk Diet.*	*Low Diet.*	*Spoon Diet.*
A pint of broth, with barley grains and onions, mutton 1 pound, salt ½ ounce, pepper for soup 1 drachm.	2 pints of milk with or without rice.	A pint of broth, 8 ounces of mutton or 1 chicken.	4 ounces of sago, with ½ an ounce of sugar.

SUPPER.

Full Diet.	*Milk Diet.*	*Low Diet.*	*Spoon Diet.*
Tea ¼ ounce. Sugar ½ ounce. Milk ½ measure.	Tea ¼ ounce. Sugar ½ ounce. Milk ½ measure.	Tea ¼ ounce. Sugar ½ ounce Milk ½ measure.	Tea ¼ ounce. Sugar ½ ounce. Milk ½ measure.

ARTICLES COMPOSING THE DIFFERENT HEADS OF DIET PER DIEM.

Full.	*Milk.*	*Low.*	*Spoon.*
Meat 1 pound. Bread 1 pound. Butter 1 ounce. Milk 1 measure. Sugar 1 ounce. Tea ½ an ounce. Rice 2 ounces, 1 for congee Salt ½ an ounce. Onions 1 ounce for soup. Pepper 1 drachm for ditto. Barley ½ an ounce for ditto. Flour ½ an ounce for ditto. Firewood 2 seers.	Bread one pound. Milk 2 pints. Ditto 1 measure for Tea Sugar 1 ounce. Tea ½ an ounce. Rice 2 ounces. Firewood 2 seers.	Meat 8 ounces. Bread 8 ounces. Milk 1 measure Sugar 1 ounce. Tea ½ an ounce. Rice 2 ounces. Salt ½ an ounce. Onion 1 ounce. Pepper 1 drachm. Barley ½ ounce. Flour ½ ounce. Firewood 2 seers.	Bread 8 ounces. Sago 4 ounces. Sugar 1½ ounce. Tea ½ ounce. Milk 1 measure. Rice 2 ounces. Firewood 2 seers.

Extras, such as Rice, Puddings, Eggs, Fish, Vegetables, Beefsteak, Mutton Chops, Beer, Wine, Jelly, Arrow-root, &c. when ordered.

TABLE OF DIET FOR NATIVE PATIENTS.

Hindus.	Mahomedans.
Breakfast 8 A. M	*Breakfast* 9 A. M.
Rice 5 chittacks. Dholl 1 chittack.	Rice 3½ chittacks. Dholl 1 chittack.
Dinner 4 P. M.	*Dinner* 3 P. M.
Rice 5 chittacks. Fish Curry and Vegetables.	Rice 3½ chittacks. Meat Curry and Vegetables.
	Supper 7 P. M
	Rice 3½ chittacks. Meat Curry and Vegetables.

The Mahomedan patients get meat-curry three times a week, and fish-curry on the intermediate days. The extras are pigeons, curried or boiled, chuppaties or flour-cakes, &c. Those on milk diet have one seer of milk, with the usual allowance of rice made into congee or gruel, with one ounce of sugar. Those on spoon diet have four ounces of sago, with one ounce of sugar, and a pint of milk.

Each patient is allowed ½ an ounce of tobacco daily, and one seer of firewood for cooking.

SURGICAL HOSPITAL

SECTION XIX.

1. The Surgical Hospital shall be under charge of the Professor of Surgery and open at all hours, day and night, for the reception of Europeans and Natives, who on admission shall be placed in their distinct wards, and immediately attended to by the "Dressers," and the House Surgeon.

2. All cases of importance shall be promptly reported to the Professor of Surgery, who will attend to render his advice, and to perform any operation that may be required, or to direct the treatment of such serious cases.

3 The current duties of the Hospital shall be performed by four of the senior students, who shall be elected "Dressers" in rotation every three months, two from the European, and two from the Native pupils.

4. The duty of the Dressers shall be the immediate charge and treatment of the patients under the direction of the Professor of Surgery, to take a history of each case on admission and to keep a daily journal of its progress, and the treatment pursued. The Dressers shall be responsible for the due administration of the medicines prescribed, for attention to the wants and comforts of the sick, and for the cleanliness and observance of good order in the wards under their charge.

5. The Professor shall visit the Hospital daily, at which visit the students of the senior class shall attend to witness the practice and to receive clinical instruction. The Dressers alone shall be permitted to take charge of cases, apply apparatus, &c. &c. The Professor shall select the most important and instructive cases under treatment, for the clinical lectures to be delivered every Friday.

6. The Dressers shall only be allowed to perform the very minor operations of Surgery (on the living subject) and those by express permission of the Professor alone: all operations of importance being performed by the Professor himself, in presence of the students.

7. The four "Dressers" shall be in attendance at the College Hospital all day, and one Dresser shall reside on the premises during the night, as well as the House Surgeon.

FEMALE HOSPITAL.

Section XX.

1. The Female Hospital is open for the reception of all the classes of women, European and Native born.

2. This Hospital contains Wards for medical and surgical cases, and a department especially devoted to Midwifery, and is capable of accommodating eighty Patients.

3. The whole shall be under the charge of the Professor of Midwifery.

4. Under the Professor of Midwifery shall be placed the Sub-Assistant Surgeon in charge, who shall reside in the Hospital in the quarters appropriated for that purpose.

5. The resident Sub-Assistant Surgeon shall superintend the general arrangements of the Female Wards, the diet and clothing of the patients, and the administration of medicines; he shall also take charge of cases on admission, and place them under the care of one of the Clinical Clerks, attending himself to the patient, and advising, if necessary, from the severity or urgency of the case. He shall consider himself especially responsible for the cases of labor, and watch their progress during parturition, although they may be in immediate charge of one of the Clinical Clerks, taking care that the patient is kept quiet, and free from every unnecessary intrusion or annoyance.

6. The resident Sub-Assistant Surgeon shall indent upon the Apothecary for such articles as he may require for the Hospital, receiving previously the counter-signature or order of the Professor.

7. In cases requiring immediate advice from the Professor in charge of the Hospital, the resident Sub-Assistant Surgeon shall send due notice to the former, and it shall be his duty to point out at the ordinary time of visit to that Officer, all new patients who have been admitted, to bring to his notice any peculiar circumstances connected with the cases already in Hospital, and to refer to him upon any subject connected with the management of the wards, which may need the advice and attention of his superior Officer or the College Council The resident Sub-Assistant Surgeon shall see that the directions of the Professor in charge are obeyed.

8. The Clinical Clerks shall be selected from the senior students: they shall take charge of such cases as the Professor or the resident Sub-Assistant Surgeon may appoint. They shall enter in their books a report of these cases daily, and read it at the time of the visit, noting down the direction for treatment given by the Professor, and asking his advice, or that of the resident Sub-Assistant Surgeon, when they need further assistance.

9. They shall visit their patients at least twice daily, oftener if necessary.

10. In cases of labor, the Clinical Clerk in charge of the case, shall take care to be easily found when parturition begins, not absenting himself unnecessarily from home at the time when the labor is expected to come on. If possible it would be desirable that the student in charge of labour cases should reside almost entirely at the Hospital. When he is called to a labor case, he shall not leave it without placing another competent person in charge of the patient until delivery be completed, or until the House Surgeon shall tell him that he may safely depart.

11. He shall not act upon his own responsibility in any situation of the smallest difficulty, but at once consult the resident Sub-Assistant Surgeon, and if necessary, the Professor.

12. He shall treat the patients kindly, with due delicacy, and take care that the nurse and other attendants give the necessary assistance and medicines when required; any misconduct or negligence on the part of the servants or the patients under his immediate charge, he shall report to the resident Sub-Assistant Surgeon, who, if he thinks proper, will inform the Professor, but the Clinical Clerk shall on no account think himself entitled to give orders on these subjects himself, or dispute with the patients or servants.

13. It shall be the duty of the resident Sub-Assistant Surgeon to report to the Professor the behaviour of the Clinical Clerks should they misconduct themselves in any way.

14. Besides the Clerks, there shall be two students of the Secondary School attached to the Female Hospital, whose duty it will be to administer the medicines and dress the patients, write the prescriptions in Hindoostanee, and attend to the directions of the House Surgeon.

15. The establishment of Servants, &c. shall be as follows:—

3 Bearers.
2 Nurses.
1 Hindoo Cook.
1 Moslem ditto.
1 Bheestee
1 Bhaury or Water Carrier
2 Sweepers
1 Matranee.

16 The diet roll of the general wards of the Female Hospital, shall be the same as in the Male.

17. The patients in the obstetric ward, shall, in lieu of Diet, receive two annas per diem; their food to be cooked if they choose it, by the Hospital Cook.

Clinical remarks are made at the bedside of the patients daily, in addition to which a regular clinical lecture, upon all the important medical and surgical diseases, is delivered once a week in the College Theatre.

The success with which they are attended, may be gathered from the results of the Medical College Examinations, and from the career of some of the Students who have entered the public service and been placed in charge of Government Dispensaries.

In fact efficient clinical instruction is the chief object of the Medical College Hospitals.

Q. 14. Is there any and what degree of reluctance expressed by the Patients to such admission of the Students, and to the making of their cases the subject of a Lecture?

A. No reluctance has ever been expressed or implied by patients of any class, to the free admission of the students to the hospitals at all times. On the contrary, the frequent intercourse between the students and patients, together with the interest taken by the former in each particular case committed to their charge, appears to have produced a general and grateful feeling of confidence on the part of the sick towards their attendants.

No patient has ever been known to object to his case being made the subject of clinical remarks.

Q. 15. Is there any Ward in the Hospital for cases in Midwifery?

A. There is a special ward attached to the Female Hospital for Midwifery cases, and all deliveries take place in separate apartments specially constructed for the purpose.

A brief and interesting statistical account of this department, drawn up by Professor Stewart is appended, marked E.(9)

(9) See No. XIV. e. of this Appendix.

Q. 16. Has any progress been made, or is any now making, and with what prospect of success to the establishment of a Fever Ward or new Hospital upon the premises of the Medical College, and what number of Patients daily is it probable that such Hospital may be capable of receiving ?

A. In October 1843, I addressed a letter* to the Honorable Sir J. P. Grant, stating that the Medical College was very much in want of a large Native Hospital, as the Officers of that Institution were compelled to send away numerous applicants, suffering from Fever, Dysentery, and a variety of other severe and dangerous maladies, and that it struck me that the design of the Fever Hospital Committee, could be easily carried out in the original spirit of those who subscribed towards raising the funds, by aiding in the erection of a hospital for the above mentioned purposes, to be attached to the Medical College.

* Supra page 13, Paper marked No IV. *a.*—J M

The subjoined extracts from the annual Reports of the Medical College, for the last three years, will show what steps have since been taken in the matter.

In 1845 it is stated that " In the last annual Report it was mentioned, that a correspondence had been opened with the Fever Hospital Committee, upon the subject of expending their funds in establishing a central Fever Hospital, in connection with the Medical College. In reply to Dr. Mouat's Letter, Sir John Peter Grant, the President of the Committee, stated that as Government, under the circumstances of the present financial means of the Committee, were unwilling to incur any additional expense, such as might be defrayed by the Calcutta community, the Committee were desirous of ascertaining whether in the event of the Hospital being connected with the College, the Officers of that Institution would undertake to afford to the Patients the requisite supplies of provisions and medicines, medical and other attendance necessary to their treatment. All these conditions were at once complied with by Government and the Council of Education, and while the subject was under the consideration of the Committee, Baboo Mutty Loll Seal munificently presented a piece of ground, valued at 12,000 Rupees, in the immediate vicinity of the College, for the purpose of aiding to form the site of the proposed Hospital. As soon as this was announced to the Committee, the following Resolutions were adopted by that body, and communicated to the Council of Education ; viz.—

1st. Resolved—That the sum at the disposal of the Committee amounting on the 1st July 1844, to 55,462 : 10 : 3, together with such further sums as may be collected of the subscriptions not yet paid in, amounting in all to Rupees 6,675 : 7 : 9, be appropriated to the erection of a Fever Hospital on the ground mentioned in the letter under yesterday's date to the Chairman, from the Secretary to the Council of Education, given with so much liberality and beneficence, as a site for the proposed Fever Hospital adjoining the Medical College, by Muttyloll Seal.

2nd. Resolved—That the Chairman be requested to send the above Resolution in circulation to the several absent members of the Committee, with a request, that they will signify their approbation of the same in writing, and that the Chairman do communicate to the absent members, the summary of the reasons which have induced the members of the Committee present to come to the above Resolution.

3rd. Resolved—That a copy of these Resolutions be transmitted to the Secretary to the Council of Education, with a copy of the plan and estimate of the Fever Hospital, framed by Major Fitzgerald, and contained in Appendix F. pages 177 to 180.

4th. Resolved—That the Council of Education be requested to communicate with Major Fitzgerald on the subject of adopting the plan proposed by him for the large Hospital then contemplated, to the diminished fund, which it is not in the power of the Committee to appropriate to that object, keeping in view the possibility of the Committee being enabled by means of future subscriptions to enlarge the building, and that the Council of Education be

requested to communicate to the Chairman of the Committee, the result of their communication with Major Fitzgerald.

In addition to the above the Council of Education published an appeal to the community, soliciting additional funds. The following formed the introduction to the pamphlet referred to, which was composed chiefly of extracts from the valuable and voluminous published Reports of the Municipal Committee.

"Baboo Muttyloll Seal having munificently presented a piece of ground in the immediate vicinity of the Medical College for the purpose of aiding to form the site of a Fever Hospital, and the Fever Hospital Committee having in consequence promised to transfer their funds to the Council of Education, to carry out the original objects for which they were collected, it is deemed advisable to make a fresh appeal to the public upon so important a subject, to procure additional aid towards the accomplishment of an object of so much benefit and importance to the suffering poor of this great City. The Professors attached to the Medical College have volunteered to perform gratuitously the duty of affording aid to the sick of the proposed Hospital, which will become a part of the regular duties of those Officers and of their successors in the College.

The Government has likewise promised to maintain the requisite establishment, and afford all the medicine, diet, &c. that will be necessary. Under these circumstances, it only remains to procure sufficient funds to provide a Native General Hospital, worthy of the City, and commensurate with its wants; when a design which has been contemplated for some time past, by some of the most enlightened philanthropists in India, will be carried into effect without further delay. As the public may not at present be perfectly aware of the truly frightful ravages of Fever and similar diseases among the Native population of Calcutta and its immediate neighbourhood, it is deemed advisable to present a brief abstract of the amount of sickness and mortality, with their causes, and the means of affording relief to the multitudes who now perish without any solace or succour.

The only Institutions existing at Calcutta and its vicinity, for the treatment of the diseases to which Natives, as well as Europeans, are subject, are the General Hospital, the Native Hospital, the Police Hospital, the Leper Asylum, the Male and Female Hospitals attached to the Medical College, and the Dispensaries situated in various parts of the City and its Suburbs. In none of these however, is special provision made for the in-door treatment of Fevers of various kinds occurring among Natives; and with the exception of the Police Hospital cases of Small-Pox, and all contagious diseases are carefully excluded.

The average amount of sickness existing in Calcutta, at all times and from every cause, in a fixed and floating population, which has been estimated at 300,000 persons, is 18,000, and of these at least one-fifth or about 3,000 persons, die before the end of each year from acute attacks of Fevers, or its numerous, dangerous, and fatal sequelæ, without adequate shelter, clothing, food, or medicine of any description.

Among the causes of this large amount of sickness, may be enumerated the improper unwholesome diet of the Natives generally, their scanty clothing, exposure to the sudden alternations of climate incidental to the country, sleeping in damp, confined, ill-ventilated huts, for the most part without any other protection from immediate contact with the soil, than a bed of mats or leaves, and exposure to the noxious exhalations surrounding them on every side from rank, decayed, luxuriant vegetation, putrefying animal matters, the poisonous mephytic gases issuing from sewers, wells, cesspools, foul drains, and burial grounds, and the malaria and miasmata ever present, and ever active in the work of destruction. The more dense and crowded the neighbourhood, and the more indigent its inhabitants, the greater is the intensity of disease, and the more fatal its results. In the immediate vicinity of Calcutta, the same causes of disease exist in a somewhat diminished degree, and to them are superad-

ded the baneful effects produced by the vicinity of the Salt Water Lake, and extensive paddy-fields. The mortality from small-pox alone, during its recent epidemic visitation, ascertained from the Police records, was in six months 2,856,* and this was but a very small proportion of those actually attacked by the pestilence, many of whom departed to their homes, and died by the road, scattering the seeds of the disease far and wide; while every Hospital and Dispensary, for some time subsequently, presented numerous victims of the secondary effects of the malady, disfigured, mutilated, and in many instances dying from these effects. For this the remedy afforded by Government, when the epidemic began to decline, was utterly inadequate and inefficient; few resorted to the Small-Pox Hospitals, and they made no impression upon the public mind. Had a Fever Hospital been in existence at the commencement of the outbreak, a very different result would have been exhibited. The urgent necessity that exists for the establishment of a Fever Hospital, the large amount of good that might be effected by it, the degree of unutterable and unheard of misery that it would alleviate, and the beneficial change that it would ultimately effect upon the general healthiness of Calcutta, and its neighbourhood, are so universally known and acknowledged, that it appears almost unnecessary to dwell at any greater length upon the subject, or cite the mass of valuable and heart-rending evidence of sickness and suffering, contained in the Report of the Fever Hospital Committee. It would afford relief to the poor Hindoos of every caste, poor Mussulmans, poor Christians poor Jews, and the many indigent strangers in the City, who resort to it from all quarters to beg, or gain a livelihood by honest industry. It has been estimated upon accurate data, and from the evidence of some of the most gifted members of the Medical Profession in India, that a small Hospital, containing only 200 beds, would be capable of receiving and discharging 600 patients labouring under acute forms of Fever every month, or 7,200 patients in the year. If the Hospital should contain 300 beds, and a smaller one would be quite inadequate to the demands for assistance, the number relieved in a month would be 900, or in a year 10,800, a small proportion of the sick, but a large number of persons to be annually rescued from the certainty of death, and placed where each is within a reasonable hope of recovering, and where it is certain that the great majority will recover.

At the same time all classes of the clergy, cordially and zealously seconded the efforts of the Council, by preaching sermons upon the subject. Among them the Council are especially indebted to the Venerable Archdeacon Dealtry, who preached three sermons in behalf of the sick poor of the city, "The Most Rev. Dr. Carew, Archbishop of Edessa, Drs. Charles and Duff, and the Rev. Messrs. Boaz, Meiklejohn, and Leslie The whole sum at present realized is more than Company's Rupees 21,000."

In 1846, it was mentioned that "during the past year the subscriptions for this great object have increased considerably, as will be seen by the following brief statement—

Total subscription, ...				34,038		
Amount of subscription realized,	33,876	7	9			
Outstanding, . .	162	0	0			
				34,038	7	9

	Hindus.	*Mahomedans*
* January,	91	66
February,	240	215
March,	548	415
April,	493	263
May,	248	127
June,	108	12

Interest receivedf rom the Union Bank from the 15th October 1844 to the 31st December 1845, 3 per cent., ...	508	4	11
Interest from other sources, ...	823	6	3
	1,331	11	2

ABSTRACT.

Amount of subscriptions, ...	33,876	7	9
Ditto of interest.	1,331	11	2
Total Co's. Rs.	35,208	2	11

"The special thanks of the Council have been returned to all the donors, and were more particularly due to Rajah Sutto Churn Ghosal of Benares, who in addition to the munificent sums which he and his family have already contributed to charitable and benevolent purposes, presented the Fever Hospital with 10,000 Rupees.

"The amount realized by the new subscriptions together with that already collected by the Fever Hospital Committee, is amply sufficient to construct a building capable of containing nearly 300 sick.

"The plans and estimates have been submitted to Government sometime since, together with a proposal to purchase an additional piece of ground, so that the Council hope that this great city will not be much longer without so useful and necessary an Institution."

MEDICAL COLLEGE : FRED. J. MOUAT, M. D.,
April 17th, 1847. *Secretary*

* Addition from the last Report printed since the above was sent in. 13th May, 1847 — F. J. M.

"The following* is a specification of the new Fever Hospital Funds, which have accumulated since the publication of the last Annual Report :

Amount of Subscriptions and Interest published in the last Report, ..	35,208	2	11
Amount of Subscriptions realized since, ...	2,863	0	0
Interest from various sources of Investment, ...	2,472	15	1
	40,544	2	0
Amount invested in Company's New 5 per cent. Loan, ...	38,500	0	0
Amount lent upon Interest of 6 per cent., ...	1,800	0	0
Ditto, in the Union Bank, ...	66	3	9
Ditto, expended in levelling the ground presented by Baboo Mutty Loll Seal, lithographing 400 Receipts and 500 Circulars, &c., . ..	177	14	3
Total, .	40,544	2	0

The erection of the Fever Hospital has been delayed by the general proposal of removing the College itself. Should this be found impracticable, the Council trust that the extension of the Institution in its present position, and building of the Fever Hospital, will be sanctioned by the Government at an early period."

MEDICAL COLLEGE : FRED. J. MOUAT, M. D.,
May 13th, 1847. *Secretary.*

No. XIV. *a.*

(A.) *Annual Return of Diseases treated in the Medical College Hospital, under Professors* Jackson *and* Raleigh, *during the year* 1841.

	Diseases.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
Professor Jackson.	Febris Intermittens Quotidiana,	3	36	39	39	0	0	
	,, ,, Tertiana, ..	1	47	48	45	2	1	
	,, Remittens, ...	0	29	29	21	8	0	
	,, Continua Communis, ..	5	164	169	157	10	2	
	Pneumonia, ...	1	24	25	22	3	0	
	Bronchitis, ...	3	11	14	12	2	0	
	Peritonitis, ...	0	2	2	2	0	0	
	Gastritis, ...	0	5	5	5	0	0	
	Enteritis, ...	0	3	3	3	0	0	
	Hepatitis Acuta, .. .	0	29	29	23	4	2	
	,, Chronica, .	0	4	4	4	0	0	
	Splenitis, ...	2	26	28	23	4	1	
	Rheumatismus Acutus, ..	4	124	128	121	0	7	
	,, Chronicus, .	5	60	65	63	0	2	
	Hæmoptysis, .. .	0	2	2	0	2	0	
	Phthisis Pulmonalis, .. .	0	9	9	0	9	0	
	Dysenteria Acuta,*	5	75	80	56	20	4	* Nearly all bad subjects, chiefly drunken Sailors.
	,, Chronica, . .	0	7	7	5	2	0	
	Apoplexia,†	0	13	13	0	13	0	† Six of these were cases of insolation, the exposure to the sun having occurred while the individuals were in a state of intoxication. All the apoplectic cases were admitted in the last stage.
	Paralysis, ...	2	6	8	8	0	0	
	Epilepsia, ...	0	3	3	3	0	0	
	Colica, ...	0	15	15	15	0	0	
	Cholera Morbus,‡ . .	0	164	164	101	61	2	‡ The greater number of the fatal cases were admitted in a state of collapse.
	Diarrhœa, ...	6	22	28	21	6	1	
	Delirium Tremens, .	2	36	38	29	9	0	
	Anasarca, ...	1	8	9	9	0	0	
	Ascites, .. .	1	15	16	6	8	2	
Professor Raleigh—	Hydrocele, .	1	8	9	9	0	0	
Professor Jackson.	Syphilis Primitiva, . ..	5	37	42	38	0	4	
	,, Consecutiva, . .	0	9	9	9	0	0	
	Scorbutus, ...	0	6	6	5	1	0	
	Icterus, ...	0	3	3	2	1	0	
Professor Raleigh.	Strictura Urethræ, . .	0	5	5	5	0	0	
	Hernia Humoralis . .	1	4	5	5	0	0	
	Dysuria, . ..	1	9	10	10	0	0	
	Aneurisma, ...	0	1	1	0	1	0	
	Elephantiasis, .	1	11	12	11	1	0	
	Calculus Vesicæ, . ..	0	2	2	2	0	0	
	Cancer, . .	0	1	1	0	1	0	
	Sarcoma, . . .	0	3	3	3	0	0	
	Hernia Inguinalis, .. .	0	1	1	1	0	0	
	,, Strangulata, . .	0	5	5	5	0	0	
	Fistula in Ano, ...	0	2	2	2	0	0	
	,, Perineo, . ..	0	3	3	3	0	0	
	Luxatio, ...	0	5	5	5	0	0	
	Vulnus Incisivum, ...	2	62	64	56	2	6	
	,, Contusum, . ..	0	37	37	33	0	4	
	Contusio, ...	4	38	42	40	0	2	
	Ambustio, ...	0	5	5	4	1	0	
	Ulcus, ...	6	43	49	41	2	6	
	Fractura, ...	2	11	13	9	2	2	
	Amputatio, ...	0	2	2	2	0	0	
	Morbi Oculorum, ...	0	5	5	4	0	1	
	Concussio Cerebri, ...	1	9	10	6	4	0	Two of the fatal cases were run over the remaining two were injured by the falling of houses.
	Total, ...	65	1,266	1,331	1,103	179	49	

Medical College :
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *b*.

(B.) *Annual Return of Diseases treated in the Medical College Hospital, from* 1st *May to 30th April*, 1842-3.

Diseases	Remained	Admitted.	Total	Discharged.	Died	Remaining.	Remarks.
Febris Intermittens,	1	49	50	50	0	0	
,, Remittens,	0	18	18	17	1	0	
,, Continua Communis,	2	65	67	64	3	0	
Typhus Mitior,	0	2	2	0	2	0	
Pneumonia,	0	2	2	2	0	0	
Bronchitis,	0	11	11	10	0	1	
Pleuritis,	0	14	14	14	0	0	
Peritonitis,	0	2	2	1	1	0	
Hepatitis Acuta,	2	19	21	17	2	2	
,, Chronica,	0	1	1	1	0	0	
Splenitis,	1	42	43	27	12*	4	* Most of these cases were admitted in the last stage of the disease
Rheumatismus Acutus,	7	61	68	62	0	6	
,, Chronicus,	2	38	40	37	0	3	
Cynanche Tonsillaris,	0	3	3	3	0	0	
Hæmoptysis,	0	5	5	2	3	0	
Phthisis Pulmonalis,	0	11	11	0	11	0	
Dysenteria Acuta,	4	157	161	117	37†	7	† The greater portion admitted in the last stage of the disease, when active treatment could not be adopted
,, Chronica,	0	16	16	11	3	2	
Apoplexia,	0	13	13	2	11‡	0	‡ Eight of the fatal cases were cases of Insolation in European seamen, brought on by exposure to the mid-day sun while in a state of intoxication
Paralysis,	0	10	10	10	0	0	
Epilepsia,	0	11	11	11	0	0	
Colica,	0	10	10	10	0	0	
Cholera Morbus,	2	117	119	75	44§	0	§ Nearly all admitted in the stage of collapse, many of them European Sailors, suffering at the same time from Delirium Tremens
Diarrhœa,	1	15	16	14	0	2	
Delirium Tremens,	0	66	66	58	5	3	
Poisoning,	0	3	3	3	0	0	
Anasarca,	0	10	10	8	2	2	
Erysipelas,	0	3	3	3	0	0	
Ascites,	2	12	14	7	7	0	
Diabetes,	0	2	2	2	0	0	
Hydrocele,	0	8	8	7	1	0	
Syphilis Primitiva,	4	78	82	72	0	12	
,, Consecutiva,	0	9	9	8	0	1	
Scorbutus,	0	3	3	3	0	0	
Icterus,	0	3	3	3	0	0	
Strictura Urethræ,	0	3	3	3	0	0	
Hernia Humoralis,	0	7	7	6	0	1	
Dysuria,	0	5	5	5	0	0	
Eneuresis,	0	3	3	3	0	0	
Aneurisma,	0	2	2	0	2	0	
Scrofula,	0	2	2	2	0	0	
Elephantiasis,	0	15	15	13	0	2	
Gangrena,	0	1	1	0	1	0	
Variola,	0	2	2	2	0	0	
Cancer,	0	2	2	0	2	0	
Tetanus,	0	2	2	2	0	0	
Hernia Inguinalis,	0	1	1	1	0	0	
,, Strangulata,	0	4	4	4	0	0	
Fistula in Ano,	0	3	3	3	0	0	
,, Perineo,	0	1	1	1	0	0	
Luxatio,	0	7	7	7	0	0	
Vulnus Incisivum,	6	34	40	36	0	4	
,, Contusum,	4	43	47	41	0	6	
,, Sclopitorum,	0	1	1	1	0	0	
Contusio,	2	31	33	28	0	5	
Ambustio,	0	25	25	6	17‖	2	‖ All severe cases, 23 of the number occurred from an explosion of Gunpowder in the China Bazar.
Ulcus, ...	6	49	55	45	0	10	
Fractura,	2	35	37	26	7¶	4	¶ The fatal cases were fractures of the skull from falls and accidents, &c.
Morbi Oculorum,	1	7	8	8	0	0	
Concussio Cerebri,	0	7	7	3	4	0	
Total,	49	1,181	1,230	977	178	75	

MEDICAL COLLEGE:

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *c.*

(C.) *Annual Return of Diseases treated in the Male Hospital of the Medical College, from the 1st of May* 1843 *to the 30th of April* 1844.

Diseases	Remained	Admitted	Total.	Discharged	Died.	Remaining.	Remarks.
Febris Intermittens,	0	47	47	47	0	0	
,, Remittens,	0	43	43	37	6	0	
,, Continua Communis,	0	130	130	115	15	0	
Pneumonia,	0	4	4	4	0	0	
Bronchitis,	1	16	17	17	0	0	
Pleuritis,	0	6	6	6	0	0	
Enteritis,	0	3	3	1	2	0	
Hepatitis Acuta,	2	15	17	13	4	0	
,, Chronica,	0	2	2	2	0	0	
Splenitis,	4	34	38	33	5	0	
Rheumatismus Acutus,	6	106	112	112	0	0	
,, Chronicus,	3	32	35	35	0	0	
Hæmoptysis,	0	4	4	3	1	0	
Phthisis Pulmonalis,	0	12	12	0	12	0	
Dysenteria Acuta,	7	176	183	148	35	0	
,, Chronica,	2	35	37	24	13	0	
Apoplexia,	0	7	7	0	7	0	
Paralysis,	0	13	13	13	0	0	
Epilepsia,	0	8	8	8	0	0	
Colica,	0	16	16	16	0	0	
Cholera Morbus,	0	169	169	104	65	0	
Diarrhœa,	2	43	45	45	0	0	
Delirium Tremens,	3	101	104	102	2	0	
Aneurisma,	2	0	2	0	2	0	
Anasarca,	0	8	8	8	0	0	
Erysipelas,	0	3	3	3	0	0	
Ascites,	0	7	7	4	3	0	
Hydrocele,	1	21	22	22	0	0	
Syphylis Primitiva,	12	103	115	115	0	0	
,, Consecutiva,	1	10	11	11	0	0	
Scorbutus,	0	4	4	4	0	0	
Icterus,	0	4	4	4	0	0	
Hernia Humoralis,	1	5	6	6	0	0	
Gonorrhœa,	0	20	20	20	0	0	
Dysuria,	0	6	6	6	0	0	
Scrofula,	0	4	4	4	0	0	
Elephantiasis,	2	7	9	9	0	0	
Gangrena,	0	3	3	0	3	0	
Variola,	0	5	5	4	1	0	
Tetanus,	0	6	6	0	6	0	
Hernia Strangulata,	0	2	2	2	0	0	
Tumores,	0	2	2	2	0	0	
Psora et Herpes,	0	2	2	2	0	0	
Luxatio,	0	4	4	4	0	0	
Vulnus Incisum et Contusum	10	120	130	129	1	0	
Contusio,	5	70	75	75	0	0	
Ambustio,	2	4	6	2	4	0	
Ulcus,	8	113	121	121	0	0	
Fractura,	4	26	30	30	0	0	
Morbi Oculorum,	0	4	4	4	0	0	
Concussio Cerebri,	0	6	6	3	3	0	
Poisoning,	0	7	7	6	1	0	
Total,	78	1,598	1,676	1,485	191	0	

MEDICAL COLLEGE :
April, 1847.

FRED. J MOUAT, M. D,
Secretary.

No. XIV. *d.*

(D.) *Annual Return of Diseases treated in the Male Hospital of the Medical College, from the 1st of May 1844 to the 30th April 1845.*

Diseases.	Remained	Admitted.	Total.	Discharged.	Died.	Remaining	Remarks.
Febris Intermittens, ...	0	57	57	56	0	1	
,, Remittens, ...	0	34	34	31	3	0	
,, Continua Communis, ..	0	94	94	88	4	2	
Pneumonia, ...	0	13	13	11	1	1	
Anasarca, ...	0	15	15	15	0	0	
Ascites, ...	0	11	11	4	5*a*	2	*a* All occurring in debilitated Natives, admitted in the last stage of disease.
Enteritis, ...	0	0	0	0	0	0	
Hepatitis Acuta, ...	0	11	11	8	2	1	
,, Chronica, ...	0	2	2	0	0	2	
Splenitis, ...	0	41	41	30	3	8	
Rheumatismus Acutus, . ..	0	74	74	64	0	10	
,, Chronicus, . ..	0	45	45	39	0	6	
Hœmoptysis, ...	0	2	2	1	0	1	
Phthisis Pulmonalis, ...	0	15	15	0	15*b*	0	*b* Mostly occurring among native Portuguese Christians.
Dysenteria Acuta, ...	0	132	132	105	16*c*	11	
,, Chronica, ...	0	53	53	31	18	4	*c* All severe cases, many of the hæmorrhagic form, occurring among European Seamen of dissipated habits, and admitted to Hospital in an advanced stage of the disease when active treatment was entirely precluded.
Apoplexia, ...	0	8	8	0	8*d*	0	
Paralysis, ...	0	9	9	7	0	2	
Epilepsia, ...	0	5	5	4	0	1	
Colica, ...	0	4	4	4	0	0	
Cholera Spasmodica, ...	0	124	124	70	48*e*	6	*d* Several of these were cases of insolation in drunken Sailors, occurring after exposure to the sun
Diarrhœa, ...	0	25	25	25	0	0	
Delirium Tremens, ...	0	65	65	60	0	5	*e* A great proportion of the cases were admitted in the stage of collapse, and occurred for the most part among Sailors of dissipated character, many of whom were suffering at the time from Delirium Tremens.
Aneurisma, ...	0	1	1	0	0	1	
Erysipelas, ...	0	2	2	1	0	1	
Hydrocele, ...	0	24	24	20	0	4	
Syphilis Primitiva, .	0	97	97	90	0	7	
,, Consecutiva, .	0	13	13	12	0	1	
Scorbutus, ...	0	7	7	7	0	0	
Icterus, . . .	0	1	1	1	0	0	
Gonorrhœa, ...	0	15	15	12	0	3	
Dysuria, ...	0	8	8	8	0	0	
Scrofula, ...	0	3	3	2	1	0	
Elephantiasis, ...	0	6	6	4	0	2	
Gangrena, ...	0	8	8	4	2	2	
Variola, ...	0	0	0	0	0	0	
Tetanus, ...	0	7	7	1	6*f*	0	*f* Five of these were cases of Traumatic Tetanus, occurring after severe injuries: one case of the idiopathic form recovered.
Hernia Strangulata, ...	0	0	0	0	0	0	
Tumores, ...	0	2	2	0	0	2	
Psora et Herpes, ...	0	1	1	1	0	0	
Luxatio, ...	0	8	8	6	0	2	
Vulnus Incisum et Contusum, ...	0	89	89	81	4*g*	4	*g* The fatal cases were compound fractures of the skull, with injury of the brain, occasioned by falls from the tops of houses, &c.
Contusio, ...	0	43	43	41	0	2	
Ambustio, ...	0	7	7	6	1*h*	0	
Ulcus, ...	0	61	61	59	0	2	*h* The fatal case occurred in a man who was extensively burnt by sulphuric acid.
Fractura, ...	0	30	30	22	0	8	
Concussio Cerebri, ...	0	3	3	3	0	0	
Poisoning, ...	0	10	10	10	0	0	
Chorea, ...	0	1	1	1	0	0	
Morbi Oculorum, ...	0	1	1	1	0	0	
Total, ...	0	1,287	1,297	1,046	137	104	

MEDICAL COLLEGE:
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *e*.

(E.) *Statistical History of the Female Hospital.*

(The Midwifery Ward was opened in January 1841.)

Since that time the number of women admitted for delivery has been 244, viz.—

In	1841,	30
	1842,	41
	1843,	37
	1844,	35
	1845,	47
	1846,	48
January and February	1847,	6—exhibiting an average of 39 cases per annum.

Of the above 244 cases, the following Table shows the classification of Labors :—

Natural.	Premature.	Tedious.	Laborious.	Preternatural.	Complicated.	Twins.
171	31	7	14	12	6	3

The following were the castes of Patients :—Hindus 167, Mahomedans 45, Christians 32.

THE AGES OF THE MOTHERS WERE—

Age.	No.	Age	No	Age	No.
Æt. 15 Years,	2	24 Years,	33	33 Years,	0
16 ,,	0	25 ,,	39	34 ,,	9
17 ,,	2	26 ,,	17	35 ,,	12
18 ,,	7	27 ,,	17	36 ,,	3
19 ,,	2	28 ,,	8	37 ,,	0
20 ,,	28	29 ,,	2	38 ,,	3
21 ,,	3	30 ,,	37	39 ,,	0
22 ,,	16	31 ,,	0	40 ,,	5
23 ,,	7	32 ,,	2	42 ,,	1

The record of the children's "sex" gives 89 males to 80 females born alive.

In the classified table of labors, the term "Natural" labor has been used in a somewhat wider sense than authorized by Denman, since a majority of the cases actually exceeded 24 hours in duration, but were otherwise easy and natural in their progress. Of those of this class delivered in Hospital in the regular course, having been admitted some days or weeks previously, it is gratifying to state that not one died from puerperal fever of any sort, although several died soon after delivery from the effects of pre-existing disease.

Of the cases set down as "Premature," many were in fact abortions, occurring at an early stage of pregnancy ; either in consequence of accident, or disease, or design. Many if not all of these cases were attended with violent and dangerous symptoms, and the lessons derived from such examples have been of great value and importance to the pupils.

In the class of "Difficult" labors, including tedious and laborious, there will be found a very remarkable disproportion as regards number, and I regret to say a very lamentable want

of success in our instrumental practice, if compared with other Institutions in Europe. Yet to account for this it may be sufficient to mention, that all the cases of difficult labor treated in Hospital, with but few exceptions, were brought into the wards during parturition and at an advanced stage thereof, and often from a distance either by the Police or the despairing relatives of the patients, as a last chance of life, after being subjected for hours, perhaps days, to the meddlesome and unskilful handling of ignorant native midwives, and when but little hope of success attended any treatment.

The following is a brief detail of the symptoms, treatment, and termination of each of these cases as they occurred:—

Case 1. *Tedious*—powerless, from long duration of labor, (upwards of three days,) the forceps was used Both mother and child recovered.

Case 2. Under exactly similar circumstances, the forceps was applied Mother died.

Case 3. *Laborious*—from distortion of pelvis Head long arrested in the cavity, forceps used. Mother recovered.

Case 4. *Tedious*—from inefficient and partial uterine action, five days in labor, roughly handled, passages dry and inflamed, forceps used. Died next day.

Case 5. Had been 36 hours in labor before admission, incipient inflammation of os uteri and passages. V. S. and Solution Antim. Tart. employed; subsequently the forceps. Mother died.

Case 6. *Laborious*—from inefficient uterine action after two days in labor and most meddlesome handling, forceps used. Mother died.

Case 7. *Tedious*—from great exhaustion and atony of the womb, 48 hours in labor, forceps used. Died.

Case 8. *Laborious*—from irregular action, opiates, afterwards the forceps. Recovered.

Case 9. Several days in labor, passages hot, dry, and inflamed from rough handling, opiates and Tartar Emetic Solution, forceps used. Died.

Case 10. *Laborious*—from pressure of an enormous hydrocephalic head for four or five days, perforated and extracted by crotchet Recovered.

Case 11. *Laborious*—from size of child's head in a small pelvis, forceps used. Died

Case 12. *Laborious*—head retained in utero, the body having been dragged away by the midwife before admission, great exhaustion and putrid discharge, head extracted by crotchet. Died.

Case 13. *Tedious*— exhaustion from seven days' labor, forceps used. Died.

Case 14. Rigid os, and perineum. V. S. and Solution Antim. Tart for hours, afterwards forceps used. Died.

Case 15. *Tedious*—from rigidity of passages and irregularity of uterine action. V. S. Solution Antim. Tart. and Laudanum at first, afterwards Ergot of Rye. Child and mother saved.

Case 16. *Tedious*—from want of power in a feeble subject, forceps used. Child and mother recovered.

Case 17. *Tedious*—from similar causes, in a better constitution, Ergot used. Recovered.

Case 18. *Tedious*—from exhaustion by previous illness, want, and misery. Delivery completed at the end of 40 hours naturally, but mother died in a few hours after.

Case 19. Said to have been 12 days in labor. Uterine action quite suspended, head resting on the perineum; delivered by the forceps, mother died one hour after from exhaustion. On autopsy uterus found to be scirrhous and perfectly powerless.

Case 20. *Laborious*—from rigidity of os induced by rough manipulation. V. S. Tartar Emetic Solution and Laudanum, forceps used. Recovered.

Case 21. *Tedious*—from want of power. Ergot of Rye, delivery natural after end of 48 hours. Recovered.

Thus it appears that out of 14 cases in which the *forceps* was employed, only four recovered.

In the third class, viz "Preternatural" labors or cross-births, there has been much better success, notwithstanding the existence of the same causes to thwart the best endeavours in our power to render aid usefully.

Of the 12 cases recorded, six were *arm* or shoulder presentations, four were *breech* presentations, and two were *footling* cases.

Of the first named six cases, two occurred among the inmates of the Hospital, and four were brought into Hospital after having been subjected to most injurious treatment, from traction of the arm, by the midwives, who thus converted them into most difficult cases. In five of the cases, the operation of *turning* was performed, with perfect success as far as regarded the life of the mother.

In one case "spontaneous evolution" occurred, and the mother recovered. Two children only were born alive, one died from asphyxia in the birth, and four were more or less putrid when born.

In the fourth class, that of "Complex" labors, six cases have occurred

Of these, two were cases of *hemorrhage* after delivery from irregular contraction or atonic condition of the womb, both recovered. Two cases of hemorrhage arose from retained placenta, of which one died. One case of placenta prœvia recovered, and one was a very unusual case of complication with a polypus tumor from the cervix uteri.

In the three (3) twin cases nothing remarkable occurred; all the mothers recovered, only two of the children lived, though all were born alive, two were premature.

Return of Admissions of General Cases in the Female Hospital, from the year 1841 *to* 1846, *inclusive.*

MONTHS.	1841	1842	1843	1844	1845.	1846.
January,	22	25	20	29	20	33
February,	25	27	27	28	28	41
March,	31	28	24	39	21	45
April,	24	24	26	29	28	33
May,	22	33	31	20	31	41
June,	23	27	22	21	31	38
July,	21	33	35	25	39	40
August,	41	35	33	28	40	41
September,	32	41	28	27	39	39
October,	24	29	24	43	31	41
November,	28	27	30	24	31	34
December,	23	22	22	22	27	31
Total,	316	351	322	335	366	457

As regards the internal management of the Hospital, it remains to state that the average number of patients does not exceed 24, though there is accommodation for three times the number. The diet and clothing is most carefully superintended by the Nuns, whom His Grace the Archbishop Carew has provided for this Christian and charitable office; the resident medical graduate, and two pupils are always in attendance at each case, and conduct the labor entirely: an European nurse and two native ayahs live in the Hospital.

It is matter of surprise that with all these inducements, and appliances, the resort to the Hospital does not increase, and that the charitable views of its founders are but so scantily fulfilled.

On the other hand, as an Educational Institution, notwithstanding the fewness of the patients, it certainly has proved highly successful, and its reputation among the natives, as I have good reason to know, is very great. I could have added about a dozen cases of Difficult and Instrumental labor occurring in different parts of the town to which I have been called by different pupils of the College, who had been summoned by their acquaintances or friends in the moment of alarm.

What has been set forth above, although *statistically* of little value, is sufficient to prove the extreme importance of the study of Midwifery, and the necessity of maintaining in efficiency a practical school for its acquirement in connection with the Medical College.

From what I have myself seen for more than 20 years of the out-door practice of Midwifery among natives of India, I am quite convinced that little good could arise from allowing our students—while yet *students*—to attend cases at their homes, as is done at University College in London, under the superintendence of the Professor. More will be learned by being simply present during one well-conducted case in Hospital, than by attendance on a dozen at their homes;—and so far as the great requisites for an accoucheur, viz. composure of mind and manner, steadiness of purpose, and expertness of hand in dangerous cases are acquirable by practice, the attainment of these qualifications seems to me utterly impossible in the filthy, smoky, and crowded hovels, to the straw of which the unfortunate Bengallee females are condemned, by native usage, in the hour of suffering.

MEDICAL COLLEGE,
20th March, 1847.

D. STEWART, M. D.,
Professor.

No. XIV. *f.*

(F.) *Annual Return of Diseases treated in the Female Hospital of the Medical College, for the year* 1842-43.

Diseases.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
Febris Intermittens, ...	0	6	6	6	0	0	
,, Continua Communis, .. .	1	12	13	12	1	0	
,, Remittens, ...	0	4	4	4	0	0	
Bronchitis, ...	0	7	7	7	0	0	
Peretonitis, ...	0	6	6	6	0	0	
Splenitis, ...	2	11	13	10	2	1	
Hepatitis Acuta, ...	0	1	1	0	1	0	
Rheumatismus Acutus, .	4	11	15	14	0	1	
,, Chronicus, . .	2	9	11	11	0	0	
Phthisis Pulmonalis, ...	0	2	2	0	2	0	
Dysenteria Acuta, ...	0	17	17	13	3	1	
,, Chronica, ...	0	6	6	5	1	0	
Apoplexia, ...	0	1	1	0	1	0	
Colica, ...	0	2	2	2	0	0	
Cholera Morbus, ...	0	26	26	15	11	0	
Diarrhœa, ...	0	7	7	7	0	0	
Leucorrhœa	0	2	2	2	0	0	
Ascites, ...	1	4	5	5	0	0	
Diabetes, ...	0	1	1	1	0	0	
Menorrhagia, ...	0	3	3	3	0	0	
Erysipelas, ...	0	2	2	2	0	0	
Hæmorrhois, ...	0	4	4	4	0	0	
Syphilis Primitiva, . . .	7	24	31	28	0	3	
,, Consecutiva, ...	0	2	2	2	0	0	
Dysuria, ...	0	1	1	1	0	0	
Cancer Uteri, ...	0	1	1	1	0	0	
Paralysis, .. .	0	2	2	1	0	1	
Vulnus Incisum, .	0	13	13	13	0	0	
,, Contusum, ...	0	11	11	10	0	1	
Ambustio, ...	0	2	2	2	0	0	
Ulcus, ...	4	9	13	11	0	2	
Fistula in Ano, .. .	0	1	1	1	0	0	
Fractura, ...	1	12	13	10	2*a*	1	*a* The fatal cases were fractures of the skull and ribs in aged women, who were run over by Carriages.
Morbi Cutis, ...	0	3	3	3	0	0	
,, Oculorum, . .	0	5	5	5	0	0	
Concussio Cerebri, . .	0	3	3	0	3*b*	0	*b* All occurring in aged women from accidents in the streets.
Abortio, ...	0	2	2	2	0	0	
Poisoning, ...	0	5	5	4	0	1	
Parturitio, ...	11	41	52	43	0	9	
Total.	33	281	314	266	27	21	

MEDICAL COLLEGE :
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FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *g*.

(G.) *Annual Return of Diseases treated in the Female Hospital of the Medical College, from 1st May 1843 to 30th April 1844.*

Diseases	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
Febris Intermittens,	0	2	2	2	0	0	
,, Continua Communis,	0	28	28	26	0	2	
,, Remittens,	0	14	14	10	4	0	
Bronchitis,	0	7	7	7	0	0	
Peretonitis,	0	3	3	3	0	0	
Splenitis,	1	7	8	5	1	2	
Rheumatismus Acutus,	1	30	31	25	0	6	
,, Chronicus,	0	10	10	8	0	2	
Phthisis Pulmonalis,	0	1	1	0	1	0	
Dysenteria Acuta,	1	33	34	24	8	2	
,, Chronica,	0	8	8	3	3	2	
Epilepsia,	0	2	2	2	0	0	
Colica,	0	1	1	1	0	0	
Cholera Morbus,	0	28	28	19	9	0	
Diarrhœa,	0	6	6	6	0	0	
Ascites,	0	4	4	3	1	0	
Menorrhagia,	0	3	3	3	0	0	
Erysipelas,	0	1	1	1	0	0	
Hæmorrhois,	0	4	4	4	0	0	
Syphilis Primitiva,	3	49	52	48	0	4	
Variola,	0	4	4	1	3	0	
Cancer Uteri,	0	1	1	1	0	0	
Paralysis,	1	3	4	3	1	0	
Vulnus Incisum et Contusum,	1	39	40	36	1	3	
Ulcus,	2	12	14	11	0	3	
Fractura,	1	6	7	7	0	0	
Concussio Cerebri,	0	4	4	1	3	0	
Abortio,	0	3	3	3	0	0	
Parturitio,	9	48	57	45	0	12	
Poisoning,	1	7	8	7	1	0	
Total,	21	368	389	315	36	38	

Medical College,
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary

No. XIV. *h*.

(H.) ***Annual Return of Diseases treated in the Female Hospital of the Medical College, from the 1st May 1844 to the 30th April, 1845.***

Diseases	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
Febris Intermittens, ...	0	9	9	9	0	0	
,, Continua Communis, ...	2	25	27	26	1	0	
,, Remittens, ...	0	7	7	6	1	0	
Bronchitis, ...	0	3	3	3	0	0	
Peritonitis, ...	0	0	0	0	0	0	
Splenitis, ...	2	10	12	9	3	0	
Rheumatismus Acutus, ...	6	19	25	23	0	2	
,, Chronicus, ...	2	10	12	11	0	1	
Phthisis Pulmonalis, ...	0	3	3	0	3	0	
Dysenteria Acuta, ...	2	27	29	19	7	2	
,, Chronica, ...	2	13	15	9	6	0	
Morbi Oculorum, ...	0	2	2	2	0	0	
Ambustio, ...	0	3	3	3	0	0	
Cholera Morbus, ...	0	19	19	11	8	0	
Diarrhœa, ...	0	8	8	8	0	0	
Ascites, ...	0	10	10	7	3	0	
Menorrhagia, ...	0	3	3	3	0	0	
Leucorrhœa, ...	0	5	5	5	0	0	
Menorrhœa, ...	0	2	2	2	0	0	
Hœmorrhois, ...	0	4	4	4	0	0	
Syphilis Primitiva, ...	4	47	51	47	0	4	
Luxatio, ...	0	1	1	1	0	0	
Tetanus, ...	0	2	2	1	1	0	
Paralysis, ...	0	0	0	0	0	0	
Vulnus Incisum et Contusum, ..	3	25	28	26	0	2	
Ulcus, ...	3	22	25	25	0	0	
Fractura, ...	0	8	8	6	1	1	
Concussio Cerebri, ...	0	2	2	2	0	0	
Abortio, ...	0	7	7	5	2	0	
Parturitio, ...	12	37	49	41	2	6	
Poisoning, ...	0	6	6	6	0	0	
Prolapsus Uteri, ...	0	1	1	1	0	0	
Phlegmasia Dolens, ...	0	1	1	0	0	1	
Carcinoma, ...	0	1	1	0	0	1	
Total, ...	38	342	380	322	38	20	

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FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *i.*

(1.) *Annual Return of Diseases treated in the Male and Female Hospitals of the Medical, College from 1st January to 31st December, 1845.*

Diseases.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
1 Zymotic diseases, ...	59	1,091	1,150	958	147	45	
2 Sporadic diseases of uncertain or variable seat, ...	0	110	110	101	7	2	
3 Of the Nervous System, ...	6	158	164	147	17	10	
4 Of the Respiratory Organs, ...	12	97	109	74	25	10	
5 Of the Organs of Circulation, ...	0	6	6	5	1	0	
6 Of the Digestive Organs, ...	14	165	179	145	23	11	
7 Of the Urinary Organs, ...	0	11	11	11	0	0	
8 Of the Organs of Generation, ...	16	67	83	76	2	5	
9 Of the Organs of Locomotion, ...	10	145	155	143	0	12	
10 Of the Integumentary System, ...	7	152	159	151	0	8	
11 Old Age, ...	0	0	0	0	0	0	
12 External causes, Poisoning Asphyxia, Injuries, ...	8	322	330	283	27	20	
1.							
1 Small-pox, ...	0	0	0	0	0	0	
2 Measles, ...	0	0	0	0	0	0	
3 Scarlatina, ...	0	0	0	0	0	0	
4 Hooping Cough, ...	0	0	0	0	0	0	
5 Croup, ...	0	0	0	0	0	0	
6 Thrush, ...	0	0	0	0	0	0	
7 Diarrhœa, ...	6	20	26	26	0	0	
8 Dysentery, ...	15	307	322	249	49	24	
9 Cholera, ...	2	235	237	151	86	0	
10 Influenza, ...	0	0	0	0	0	0	
11 Ague, ...	6	93	99	95	0	4	
12 Remittent Fever, ...	0	109	109	102	7	0	
13 Common Continued Fever, ...	9	129	138	128	5	5	
14 Erysipelas, ...	0	11	11	11	0	0	
15 Syphilis, ...	21	187	208	196	0	12	
16 Hydrophobia, ...	0	0	0	0	0	0	
2.							
17 Inflammation, ...	0	18	18	18	0	0	
18 Hemorrhage, ...	0	0	0	0	0	0	
19 Dropsy, ...	0	50	50	44	4	2	
20 Abscess, ...	0	11	11	11	0	0	
21 Mortification, ...	0	11	11	9	2	0	
22 Purpura, ...	0	0	0	0	0	0	
23 Scrofula, ...	0	5	5	5	0	0	
24 Carcinoma, ...	0	2	2	2	0	0	
25 Tumours, ...	0	13	13	12	1	0	
26 Gout, ...	0	0	3	0	0	0	
27 Atrophy, ...	0	0	0	0	0	0	
28 Debility, ...	0	0	0	0	0	0	
29 Malformations, ...	0	0	0	0	0	0	
30 Sudden deaths, ...	0	0	0	0	0	0	
3.							
31 Cephalitis, ...	0	2	2	2	0	0	
32 Hydrocephalus, ...	0	0	0	0	0	0	
Carried forward, ...	191	3,517	3,721	3,155	403	170	

No. XIV. *i.—(Continued.)*

(I.) *Annual Return of Diseases treated in the Male and Female Hospitals of the Medical College, from 1st January to 31st December, 1845.*—(Continued.)

Diseases	Remained.	Admitted.	Total.	Discharged.	Died.	Remained.	Remarks
Brought forward, ...	191	3,517	3,721	3,155	403	170	
33 Apoplexy,(a)	0	11	11	0	11	0	(a) Mostly cases of insolation among European seamen, from exposure to the sun during a state of intoxication
34 Paralysis, ...	2	18	20	18	0	2	
35 Convulsions, ...	0	0	0	0	0	0	
36 Tetanus, ...	0	4	4	0	4	0	
37 Chorea, ...	0	0	0	0	0	0	
38 Epilepsy, ...	0	14	14	13	0	1	
39 Insanity, ...	0	2	2	2	0	0	
40 Delirium Tremens, ...	14	107	121	112	2	7	
41 Brain, diseases of	0	0	0	0	0	0	
4.							
42 Laryngitis, ...	0	0	0	0	0	0	
43 Quinsey, ...	0	0	0	0	0	0	
44 Bronchitis,...	8	34	42	36	0	6	
45 Pleurisy, ...	2	16	18	16	0	2	
46 Pneumonia, ...	0	10	10	8	2	0	
47 Hydrothorax, ...	0	0	0	0	0	0	
48 Asthma, ...	0	9	9	9	0	0	
49 Phthisis, (b)	2	22	24	0	22	2	(b) The greater number occurring among Portuguese Christians.
50 Lungs, &c.,...	0	6	6	5	1	0	
5.							
51 Pericarditis, ...	0	0	0	0	0	0	
52 Aneurism,...	0	2	2	0	2	0	
53 Heart, &c. diseases of	0	5	5	5	0	0	
6							
54 Teething, ...	0	0	0	0	0	0	
55 Gastritis, ...	0	0	0	0	0	0	
56 Enteritis, ...	1	9	10	8	2	0	
57 Peritonitis,...	0	0	0	0	0	0	
58 Tabes Mesenterica, ...	0	0	0	0	0	0	
59 Worms, ...	0	0	0	0	0	0	
60 Ascites, (c)...	2	22	24	15	7	2	(c) The fatal cases occurred in old and worn-out subjects.
61 Ulceration, ...	0	0	0	0	0	0	
62 Hernia, ...	0	4	4	4	0	0	
63 Colic or Ileus, ...	0	9	9	9	0	0	
64 Intussusception, ...	0	0	0	0	0	0	
65 Stricture, ...	0	0	0	0	0	0	
66 Hematemesis, ...	0	0	0	0	0	0	
67 Stomach, &c. diseases of	0	0	0	0	0	0	
68 Pancreas, diseases of	0	0	0	0	0	0	
69 Hepatitis, ...	2	30	32	26	4	2	
70 Jaundice, ...	0	10	10	9	1	0	
71 Liver, diseases of	0	0	0	0	0	0	
72 Spleen, diseases of...	9	80	89	74	8	7	
7.							
73 Nephritis, ...	0	2	2	2	0	0	
74 Ischuria, ...	0	0	0	0	0	0	
Carried forward, ...	233	3,943	4,189	3,526	469	201	

No. XIV. *i.—(Continued.)*

(I.) *Annual Return of Diseases treated in the Male and Female Hospitals of the Medical College, from 1st January to 31st December, 1845.*—(Continued.)

Diseases.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
Brought forward, ..	233	3,943	4,189	3,526	469	201	
75 Diabetes, ...	0	0	0	0	0	0	
76 Cystitis, ...	0	0	0	0	0	0	
77 Stone, ...	0	3	3	3	0	0	
78 Stricture, ...	0	6	6	6	0	0	
79 Kidney, &c. diseases of	0	0	0	0	0	0	
8.							
80 Childbirth, ...	16	47	63	58	0	5	
81 Paramenia,...	0	6	6	6	0	0	
82 Ovarian Dropsy, ...	0	2	2	2	0	0	
83 Uterus, &c. diseases of	0	12	12	10	2	0	Including Metritis, Prolapsus Uteri, Chlorosis, Menorrhagia, &c.
9.							
84 Arthritis, ...	0	0	0	0	0	0	
85 Rheumatism, ...	10	145	155	143	0	12	
86 Joints, &c. diseases of	0	0	0	0	0	0	
10.							
87 Carbuncle, ...	0	4	4	4	0	0	
88 Phlegmon, ...	0	8	8	8	0	0	
89 Ulcers, ...	7	106	113	105	0	8	
90 Fistula, ...	0	10	10	10	0	0	
91 Skin, &c. diseases of	0	24	24	24	0	0	Including { Herpes Zoster, .. 2; ,, Circinatus, 1; ,, Inveterata, 4; Rupia, ... 3; Pompholyx, .. 2; Icthyosis, .. 1; Psoriasis, .. 7; Verucca, .. 1 }
92 Intemperance, ...	0	0	0	0	0	0	
93 Starvation,...	0	0	0	0	0	0	
94 Violent Deaths, ...	0	0	0	0	0	0	
Cause not specified.							
95 Wounds and accidents, ...	2	239	241	213	15	13	Including simple contusions, contused, incised, and lacerated wounds, burns, scalds, dislocations, concussion of the brain, &c. The deaths were chiefly caused by injuries of the brain from accidents in the streets.
96 Fractures, ...	6	70	76	69	0	7	
97 Poisoning, ...	0	13	13	11	2	0	By Arsenic, ... 2; ,, Opium, ... 3; ,, Aconite, ... 3; ,, Stramonium, ... 5. The two fatal cases were from opium and arsenic, and both of them attempts at suicide: the aconite and stramonium were administered for nefarious purposes, and solely with a view of producing temporary insensibility; many of the cases were however severe and very nearly terminated fatally, those of aconite poisoning especially.
Total, ...	274	4,638	4,925	4,198	488	246	

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FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *ii.*

(J.) *Annual Return of Diseases treated in the Male and Female Hospitals of the Medical College, from 1st January to 31st December,* 1846.

Diseases.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
1 Zymotic Diseases, ...	45	1281	1326	1153	132	41	
Sporadic Diseases—							
2 Of uncertain or variable seat, ...	2	105	107	100	3	4	
3 Of the Nervous System, ...	10	123	133	112	15	6	
4 Of the Respiratory Organs, ...	10	83	93	72	15	6	
5 Of the Organs of Circulation, ...	0	6	6	4	2	0	
6 Of the Digestive Organs, ...	11	138	149	125	17	7	
7 Of the Urinary Organs, ...	0	28	28	27	1	0	
8 Of the Organs of Generation, ...	5	71	76	68	0	8	
9 Of the Organs of Locomotion, ...	12	137	149	139	0	10	
10 Of the Integumentary System, ...	8	165	173	168	0	5	
11 External causes, Poisoning, Asphyxia, Injuries, &c., ...	20	358	378	334	20	24	
1.							
1 Diarrhœa, ...	0	31	31	31	0	0	
2 Dysentery, ...	24	270	294	242	33	19	
3 Cholera, ...	0	240	240	159	81	0	
4 Ague, ...	4	61	65	65	0	0	
5 Remittent Fever,...	0	295	295	267	16	12	
6 Common Continued Fever, ...	5	187	192	192	0	0	
7 Erysipelas, ...	0	7	7	6	1*	0	* The fatal case was Erysipelas of the head and face, from severe external injury.
8 Syphilis, ...	12	189	201	191	0	10	
9 Hydrophobia, ...	0	1	1	0	1	0	
2.							
10 Inflammation,†	0	21	21	21	0	0	† Of the Eye.
11 Dropsy,‡	2	42	44	42	0	2	‡ Anasarca, Hydrocele, &c.
12 Abscess, ...	0	4	4	4	0	0	
13 Mortification, ...	0	7	7	3	3*a*	1	*a* Two of the fatal cases were mortification of the lower extremities after severe injuries, for which they underwent amputation; the third was a case of Gangrena Senilis.
14 Scrofula, ...	0	4	4	3	0	1	
15 Carcinoma, ...	0	1	1	1	0	0	
16 Tumours, ...	0	26	26	26	0	0	
3.							
17 Cephalitis, ...	0	2	2	2	0	0	
18 Apoplexy, ...	0	12	12	0	12*b*	0	*b* Mostly cases of Insolation in European Seamen, exposed to the sun during a state of intoxication.
19 Paralysis, ...	0	13	13	11	0	2	
20 Convulsions, ...	0	3	3	1	2*c*	0	c All cases of Tetanus, 2 in the acute idiopathic form died; the third, a chronic case, recovered.
21 Epilepsy, ...	1	4	5	5	0	0	
Carried forward, ...	171	3,915	4,086	3,574	354	158	

No. XIV. *ii.—(Continued.)*

(J.) *Annual Return of Diseases treated in the Male and Female Hospitals of the Medical College, from 1st January to 31st December,* 1846.—(Continued.)

Diseases.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.	Remarks.
Brought forward, ...	171	3,915	4,086	3,574	354	158	
22 Insanity, ...	0	4	4	4*d*	0	0	*d* All four were transferred to the Lunatic Asylum as incurable.
23 Delirium Tremens, ...	7	85	92	87	1	4	
4.							
24 Bronchitis, ...	6	36	42	38	0	4	
25 Pleurisy, ...	2	20	22	22	0	0	
26 Pneumonia, ...	0	14	14	10	4*e*	0	*e* Two of the fatal cases were complicated with Pericarditis
27 Asthma, ...	0	2	2	2	0	0	
28 Phthisis, ...	2	11	13	0	11*f*	2	*f* The greater proportion of these cases, as usual, occurred among Native Portuguese Christians.
5							
29 Pericarditis, ...	0	1	1	0	1*g*	0	*g* Originally a case of acute rheumatism, with metastasis from the serous membrane of the large joints to the Pericardium.
30 Aneurism, ...	0	1	1	0	1*h*	0	*h* Of the left carotid—Died 10 days after the operation, from sloughing of the sac and ulceration of the internal jugular vein
31 Heart, &c. diseases of	0	4	4	4	0	0	
6							
32 Enteritis, ...	0	3	3	0	3*i*	0	*i* All these cases admitted in the last stage of the disease.
33 Peritonitis, ...	0	6	6	4	2*j*	0	*j* Two of the fatal cases were the result of external injury; the third was the result of ruptured bladder
34 Worms, ...	0	4	4	4	0	0	
35 Ascites, ...	2	22	24	21	2	1	
36 Hernia, ...	0	10	10	9	1	0	Four were cases of strangulated hernia requiring operation; one proved fatal from previous mortification of the intestine: the remaining six were simply cases of incarcerated hernia, reduced by taxis.
37 Colic or Ileus, ...	0	5	5	5	0	0	
38 Hepatitis	0	25	25	16	6	3	
39 Jaundice, ...	0	4	4	4	0	0	
40 Spleen, diseases of	7	59	66	60	3	3	
7.							
41 Nephritis, ...	0	2	2	2	0	0	
42 Ischuria, ...	0	6	6	6	0	0	
43 Diabetes, ...	0	1	1	1	0	0	
44 Stone, ...	0	11	11	10	1	0	The fatal case was the result of jaundice, caused by the impaction of gall stones in the biliary ducts subsequent to the operation, from which he nearly recovered.
45 Stricture, ...	0	8	8	8	0	0	
Carried forward, ...	197	4,259	4,456	3,891	390	175	

No. XIV. *ii.—(Continued.)*

(J.) ***Annual Return of Diseases treated in the Male and Female Hospitals of the Medical College, from 1st January to 31st December, 1846.*—(Continued.)**

Diseases.	Remained.	Admitted.	Total.	Discharged.	Died.	Remained.	Remarks.
Brought forward, ...	197	4,259	4,456	3,891	390	175	
8							
46 Childbirth, ...	5	52	57	49	0	8	
47 Ovarian Dropsy, ...	0	1	1	1	0	0	
48 Uterus, &c. diseases of	0	18	18	18	0	0	Including Amenorrhœa, Menorrhagia, Leucorrhœa, Abortion, Metritis, &c.
9.							
49 Rheumatism, ...	12	137	149	139	0	10	
10.							
50 Carbuncle, ...	0	6	6	6	0	0	
51 Phlegmon, ...	0	5	5	5	0	0	
52 Ulcers, ...	8	115	123	118	0	5	
53 Fistula, ...	0	16	16	16	0	0	
54 Skin, &c. diseases of .. .	0	23	23	23	0	0	Including Herpes Zoster, .. 2 Icthyosis, ... 1 Lepra Vulgaris, ... 2 Rupia, ... 4 Psora, ... 14
12.							
55 Causes not specified, ...	0	30	30	30	0	0	Including thirteen cases of Scurvy and seventeen of Cataract.
56 Wounds and accidents, ...	13	250	263	245	4	14	Including simple contusions, contused, incised and lacerated wounds, burns, scalds, dislocations, concussion of the brain, &c. The fatal cases were concussion of the brain.
57 Fractures, ...	7	64	71	49	12*k*	10	*k* Mostly fractures of the skull from injuries in the streets.
58 Poisoning, ...	0	14	14	10	4	0	By Arsenic, ... 1 ,, Aconite, ... 3 ,, Opium, ... 6 ,, Nerium Odorum, ... 1 ,, Datura, ... 3 —14 The fatal cases were— By Aconite, ... 1 ,, Opium, ... 3 — 4
Total, ...	242	4,990	5,232	4,600	410	222	

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FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *j.*

(K.) *Return of the average period of Treatment.*

Diseases	1841. Average No. of days in Hospital.	1842. Ditto.	1843. Ditto.	1844. Ditto.	1845. Ditto.	Remarks.
Febris Intermittens Quotidiana, ..	14	12	12	10	11	
,, ,, Tertiana, ..	12	11	14	14	16	
,, Remittens, ...	20	18	20	16	19	This return has been made out, with much care, by Mr. Geo. Daley, from the Hospital records.
,, Continua Communis, ...	11	14	15	12	15	
Pneumonia, ...	18	21	16	13	17	
Bronchitis, ...	22	25	20	17	21	
Peritonitis, ...	16	14	0	0	0	
Gastritis, ...	12	0	0	0	0	
Enteritis, ...	19	0	17	0	15	
Hepatitis Acuta, ...	25	21	18	14	16	
,, Chronica, ...	40	37	29	32	0	
Splenitis, ...	26	28	22	25	21	
Rheumatismus Acutus, ...	21	18	16	14	23	
,, Chronicus, ...	42	45	35	44	47	
Hæmoptysis, ...	25	19	0	22	0	
Phthisis Pulmonalis, ...	30	27	21	25	24	
Dysenteria Acuta, ...	21	24	18	22	20	
,, Chronica, ...	46	43	32	37	34	
Apoplexia, ...	1	1	1	1	1	
Paralysis, ...	23	27	30	27	24	
Epilepsia, ...	8	5	6	3	4	
Colica, ...	4	3	3	2	4	
Cholera Morbus, ...	10	8	11	10	12	
Diarrhœa, ...	11	14	17	15	14	
Delirium Tremens, ...	12	10	13	11	10	
Anasarca, ...	25	28	34	24	0	
Ascites, ...	44	37	42	26	24	
Hydrocele, ...	0	4	2	3	0	
Syphilis Primitiva, ...	18	16	14	15	16	
,, Consecutiva, ...	27	22	26	25	22	
Scorbutus, ...	14	15	18	12	0	
Icterus, ...	18	21	15	17	18	
Strictura Urethræ, ...	23	14	12	0	14	
Hernia Humoralis, ...	10	15	11	0	0	
Dysuria, ...	3	2	2	1	0	
Aneurisma, ...	51	36	0	0	27	
Elephantiasis, ...	28	25	29	24	28	
Calculus Vesicæ, ...	24	0	0	0	21	
Cancer, ...	36	22	0	0	24	
Sarcoma, ...	28	0	0	0	0	
Hernia Inguinalis, ...	10	5	0	0	4	
,, Strangulata, ...	30	4	7	0	22	
Fistula in Ano, ...	16	13	0	0	14	
,, Perinœa, ...	14	17	0	0	0	
Luxatio, ...	4	3	4	5	4	
Vulnus Incisum, ...	12	14	13	15	16	
,, Contusum, ...	18	20	17	16	18	
Contusio, ...	9	8	7	10	7	
Ambustio, ...	21	25	18	14	16	
Ulcus, ...	16	13	14	12	13	
Fractura, ...	37	42	40	42	45	
Amputatio, ...	38	0	0	0	34	
Morbi Oculorum, ...	12	14	11	16	11	
Concussio Cerebri, ...	7	4	5	9	6	

MEDICAL COLLEGE:
April 5th, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *k*.

(L.) *Table of Admissions and Deaths in the Male Hospital of the Medical College, for the year* 1841.

Months.	Europeans.						Remarks.	Natives.						Remarks.
	Admitted.		Discharged.		Died.			Admitted.		Discharged.		Died.		
	Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.		Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.	
January, ...	62	14	38	12	11	0		70	15	29	11	10	2	
February, ...	28	19	23	7	5	0		23	22	37	21	5	1	
March, ...	35	13	32	10	10	0		22	18	24	23	5	1	
April, ...	50	14	31	11	6	0		20	21	14	15	5	1	
May, ...	68	12	56	15	10	0		37	20	22	26	4	2	
June, ...	59	11	59	8	5	0	Of the deaths among Europeans— 63 were from 1 to 2 days in Hospital 28 were from 2 to 7 ditto ditto. 12 were from 7 to 14 ditto ditto 4 were from 14 to 20 ditto ditto 2 were from 20 to 40 ditto ditto	35	16	26	14	5	0	Of the deaths among Natives— 23 were from 1 to 2 days in Hospital 21 were from 2 to 7 ditto ditto 10 were from 7 to 14 ditto ditto 7 were from 14 to 20 ditto ditto 2 were from 20 to 40 ditto ditto. 2 were from 40 to 50 ditto ditto.
July, ...	50	10	42	7	8	1		21	23	24	18	4	1	
August, ...	70	13	51	10	15	0		23	18	25	16	1	1	
September, ...	78	15	58	13	26	0		21	17	23	13	5	0	
October, ...	42	18	49	6	4	0		23	22	21	17	3	2	
November. ...	40	11	39	5	4	1		26	13	14	12	8	0	
December, ...	48	9	47	7	2	1		29	11	12	10	4	0	
Total, ...	630	159	525	111	106	3		350	216	271	196	59	11	

MEDICAL COLLEGE:
April, 1847.

FRED. J. MOUAT. M. D.,
Secretary.

No. XIV. *l.*

(M.) *Table of Admissions and Deaths in the Medical College Hospital, for the year* 1842-43.

Months.	Europeans.						Remarks.	Natives.						Remarks.
	Admitted.		Discharged.		Died.			Admitted.		Discharged.		Died.		
	Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.		Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.	
May, 1842, ..	40	18	30	14	7	1		36	20	26	12	6	2	
June, ..	43	22	42	10	9	0		40	18	38	14	7	4	
July, ...	48	26	36	23	4	0		50	20	40	17	6	2	
August, ...	50	21	40	23	4	0		40	23	33	22	5	4	
September, .	63	20	50	17	7	2	Of the deaths among Europeans— 43 were from 1 to 2 days in Hospital. 30 were from 2 to 7 ditto ditto 17 were from 7 to 14 ditto ditto. 3 were from 14 to 20 ditto ditto. 2 were from 20 to 40 ditto ditto	60	31	53	17	4	3	Of the deaths among Natives— 34 were from 1 to 2 days in Hospital 25 were from 2 to 7 ditto ditto. 18 were from 7 to 14 ditto ditto. 12 were from 14 to 20 ditto ditto 9 were from 20 to 30 ditto ditto 7 were from 30 to 40 ditto ditto. 4 were from 40 to 50 ditto ditto
October, ...	50	20	47	19	6	0		39	14	30	13	5	11	
November, ..	40	19	40	16	8	0		37	16	30	16	6	3	
December, ..	42	22	36	18	11	0		26	11	31	19	9	0	
January, 1843,	28	12	24	16	5	0		36	13	26	15	8	0	
February, ..	46	20	29	17	7	2		31	16	29	13	6	0	
March, ..	57	17	53	15	11	0		40	19	54	17	4	0	
April, ..	31	11	18	9	10	0		46	14	23	14	12	2	
Total, ..	538	228	445	197	89	5		481	215	413	189	78	31	

Medical College:
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *m.*

(N.) *Table of Admissions and Deaths in the Medical College Hospital, for the year* 1843-44.

Months	Europeans. Admitted. Medical.	Europeans. Admitted. Surgical.	Europeans. Discharged. Medical.	Europeans. Discharged. Surgical.	Europeans. Died. Medical.	Europeans. Died. Surgical.	Remarks	Natives. Admitted. Medical.	Natives. Admitted. Surgical.	Natives. Discharged. Medical.	Natives. Discharged. Surgical.	Natives. Died. Medical.	Natives. Died. Surgical.	Remarks.
May, 1843, ...	40	20	42	17	6	1		42	36	36	24	13	0	
June, ...	62	20	46	20	7	1		34	29	48	21	6	2	
July, .. .	69	24	53	22	9	0		43	34	37	25	4	0	
August, ...	71	23	50	18	9	0		37	32	42	26	7	1	
September, .. .	56	22	46	17	11	0		36	24	38	18	8	0	
October, ..	57	25	42	15	8	0	Of the deaths among Europeans— 36 were from 1 to 2 days in Hospital 21 were from 2 to 7 ditto ditto. 30 were from 7 to 14 ditto ditto 10 were from 14 to 20 ditto ditto. 4 were from 20 to 40 ditto ditto.	40	30	37	22	8	0	Of the deaths among Natives— 40 were from 1 to 2 days in Hospital. 20 were from 2 to 7 ditto ditto 12 were from 7 to 14 ditto ditto. 8 were from 14 to 20 ditto ditto. 10 were from 20 to 40 ditto ditto.
November, ...	49	18	46	12	7	0		36	22	38	18	4	1	
December, . ..	39	14	42	11	13	0		39	20	42	16	2	4	
January, 1844, .	33	16	49	14	6	0		42	27	45	22	5	6	
February, ...	37	15	40	11	7	0		44	25	40	24	7	1	
March, .. .	59	11	48	15	8	0		41	23	39	22	7	0	
April, .. .	21	10	46	18	7	0		33	18	45	24	4	0	
Total, ...	593	218	550	190	98	2		467	320	487	262	75	15	

MEDICAL COLLEGE:
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *n.*

(O.) *Table of Admissions and Deaths in the Medical College Hospital, for the year* 1844-45.

Months.	Europeans.						Remarks.	Natives.						Remarks
	Admitted.		Discharged.		Died.			Admitted.		Discharged.		Died.		
	Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.		Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical	
May, 1844, ...	0	0	0	0	0	0		0	0	0	0	0	0	
June, ..	0	0	0	0	0	0		0	0	0	0	0	0	
July, ..	18	5	12	3	0	0		56	32	46	28	4	0	
August, ...	49	23	38	16	8	0		46	30	43	24	4	2	
September, ..	57	21	46	18	4	0		44	25	38	20	5	0	
October, ...	54	27	48	19	5	0	Of the deaths among Europeans— 35 were from 1 to 2 days in Hospital. 10 were from 2 to 7 ditto ditto. 4 were from 7 to 14 ditto ditto 10 were from 14 to 20 ditto ditto. 13 were from 20 to 40 ditto ditto.	53	34	45	27	8	3	Of the deaths among Natives— 24 were from 1 to 2 days in Hospital. 7 were from 2 to 7 ditto ditto. 8 were from 7 to 14 ditto ditto. 11 were from 14 to 20 ditto ditto 15 were from 20 to 40 ditto ditto.
November, ...	35	22	29	15	6	0		35	22	28	18	7	1	
December, ...	47	25	36	18	10	0		29	24	26	17	7	0	
January, 1845,	37	19	29	13	5	0		35	19	28	16	5	2	
February, ...	28	23	28	19	6	0		35	21	30	18	3	2	
March, ...	37	21	34	15	13	1		43	23	34	18	7	1	
April, ...	71	20	55	18	14	0		34	18	29	14	4	0	
Total, ...	433	206	355	154	71	1		410	248	347	200	54	11	

MEDICAL COLLEGE:
April, 1847.

FRED. J. MOUAT. M. D.,
Secretary

No. XIV. *o.*

(P.) *Table of Admissions and Deaths in the Medical College Hospital, for the year* 1845.

Months.	Europeans.						Remarks.	Natives.						Remarks.
	Admitted.		Discharged.		Died.			Admitted.		Discharged.		Died.		
	Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.		Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.	
January, 1845,	61	24	58	19	5	0		54	45	43	38	7	0	
February, ...	59	32	49	25	6	0		55	38	41	32	8	2	
March, ..	64	29	57	20	12	2		58	42	46	34	6	2	
April, ..	72	28	59	22	14	0		53	46	48	38	11	2	
May, ..	77	34	61	27	19	0		57	45	51	36	8	1	
June, ..	62	36	53	26	13	0	Of the deaths among Europeans— 63 were from 1 to 2 days in Hospital. 15 were from 2 to 7 ditto ditto. 17 were from 7 to 14 ditto ditto. 18 were from 14 to 20 ditto ditto. 4 were from 20 to 40 ditto ditto.	59	3	45	34	9	2	Of the deaths among Natives— 54 were from 1 to 2 days in Hospital 35 were from 2 to 7 ditto ditto. 22 were from 7 to 14 ditto ditto. 9 were from 14 to 20 ditto ditto. 2 were from 20 to 40 ditto ditto.
July, ..	65	32	58	25	6	0		52	37	43	32	10	0	
August, ..	68	27	54	22	12	0		55	44	47	38	8	3	
September, ..	66	25	60	21	6	0		51	47	44	42	9	3	
October, ..	68	30	62	23	4	0		57	42	47	36	9	2	
November, ..	64	34	57	29	9	0		59	48	52	44	6	2	
December, ...	62	27	56	24	9	0		55	41	46	38	10	2	
Total, ...	788	358	684	283	115	2		665	478	553	442	101	21	

MEDICAL COLLEGE:
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *p.*

(Q.) *Table of Admissions and Deaths in the Medical College Hospital, for the year* 1846.

Months	Europeans.						Remarks	Natives.						Remarks.
	Admitted.		Discharged.		Died.			Admitted.		Discharged.		Died.		
	Medical	Surgical.	Medical.	Surgical.	Medical.	Surgical.		Medical.	Surgical.	Medical.	Surgical.	Medical.	Surgical.	
January, 1846,	64	27	53	21	9	1		62	43	56	50	7	1	
February, ...	66	30	54	25	7	0		56	51	63	44	6	3	
March, ...	58	29	59	20	11	0		64	55	57	49	3	2	
April, ...	62	30	53	24	15	0		59	56	64	47	3	4	
May, ...	71	36	62	30	15	0		63	47	55	43	8	2	
June, ...	74	33	65	28	9	0	Of the deaths among Europeans— 56 were from 1 to 2 days in Hospital 17 were from 2 to 7 ditto ditto. 7 were from 7 to 14 ditto ditto. 23 were from 14 to 20 ditto ditto. 8 were from 20 to 40 ditto ditto	58	46	64	51	6	0	Of the deaths among Natives— 39 were from 1 to 2 days in Hospital 12 were from 2 to 7 ditto ditto. 17 were from 7 to 14 ditto ditto 15 were from 14 to 20 ditto ditto. 11 were from 20 to 40 ditto ditto.
July, ...	69	35	60	27	7	0		55	47	60	42	4	1	
August, ...	77	29	66	23	6	0		62	46	57	49	3	4	
September, ..	68	31	62	25	7	0		60	53	56	44	2	2	
October, ..	75	30	67	37	7	0		58	49	62	43	8	4	
November, ...	73	34	64	30	10	0		54	46	60	41	5	2	
December, ...	65	30	59	28	7	0		57	52	56	47	4	0	
Total, ...	822	374	724	318	110	1	Total, ...	708	591	710	550	69	25	

MEDICAL COLLEGE:
The 1st January, 1847.

FRED. J. MOUAT. M. D.,
Secretary.

No. XIV. q.

(R.) ***Return of Surgical Operations performed by* PROFESSOR RALEIGH, *at the Medical College, from April* 1841 *to April* 1842.**

Nature of Operations.	No. of Operations.	Result. Died.	Result. Discharged. cured.	Remarks.
Medullary Sarcoma, tumor removed from the head, ...	1 Case,	0	1	
Strangulated Inguinal Hernia operated on,...	1 Ditto,	0	1	
Hypertrophied Scrotum removed by operation, ...	8 Ditto,	1	7	
Amputations of the lower extremity, ...	2 Ditto,	0	2	
Amputations of the arm, ...	2 Ditto,	0	2	
Operation of puncturing the Bladder above the pubis for retention of Urine, ...	1 Ditto,	0	1	
Luxations of the Hip-joint reduced, ...	4 Ditto,	0	4	

In addition to the above, the following operations have been performed by Mr. Raleigh, in presence of the Students at the Native Hospital.

Amputation of extremities, ..	No.	7	—	—
,, of Penis, ...	,,	4	—	—
Cataract, ...	,,	33	—	—
Fistula in ano, . ..	,,	4	—	—
Fistula lachrymalis, .	,,	2	—	—
Dislocation of Hip-joint reduced, .	,,	5	—	—
Dislocation of Shoulder ditto, . .	,,	9	—	—
Dividing muscles of eye for Strabismus, .	,,	3	—	—
Lithotomy, . . .	,,	7	—	—
Hypertrophy of Scrotum and Labiæ, .	,,	17	—	—
Hernia (Strangulated), . .	,,	1	—	—
Polypus of the Nose, . .	,,	2	—	—
Puncturing Bladder for retention of Urine,. .	,,	4	—	—
Tapping for Dropsy (abdominal), ...	,,	4	—	—
Tying femoral artery for popliteal aneurism,	,,	1	—	—
Tumours extirpated, . . .	,,	8	—	—
Hydrocele and minor operations in great number, ...	,,	—	—	—
Imperforate Anus.	,,	1	—	—

MEDICAL COLLEGE :
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. r.

(S.) *Return of Operations performed by* Professor Raleigh, *at the Medical College Hospital, from* 1*st May* 1842 *to* 30*th April* 1843.

Nature of Operations.	No.	Result. Died.	Result. Discharged cured.	Remarks.
Hypertrophied Scrotum, ...	3	0	3	
Amputation of Extremities, ...	8	1	7	
Puncturing Bladder for retention of Urine, ...	2	0	2	
Tumours Extirpated, ...	2	0	2	
Cataract, ...	2	0	2	
Dislocation of Hip-joint reduced, ...	3	0	3	
„ of Shoulder, ...	2	0	2	
Fistula in Ano, Hydrocele and other minor Operations, ...	20	0	20	

Medical College:
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. IV. s.

(T.) *Return of Surgical Operations by* Professor Raleigh, *at the Medical College Hospital, from* 1*st May* 1843 *to* 30*th April* 1844.

Nature of Operations	No.	Result. Died.	Result. Discharged cured.	Remarks.
Trephining for compound fractures of the skull,	2	2	0	
Amputations of the arm, ...	2	0	2	
Ditto of the leg, ...	3	1	2	
Hypertrophied scrotums removed, ...	7	0	7	
Large carcinomatous tumor removed from the pubis, ...	1	0	1	
Vascular sarcomatous tumor removed from head, ...	1	0	1	
Ditto medullary sarcoma from ditto, ...	1	0	1	
Adipose and encysted tumors from various parts of the body, ...	6	0	6	
Luxations of the hip-joint reduced, ...	2	0	2	
Ditto of the shoulder ditto ditto, ...	2	0	2	
Operations for cataract, ...	1	0	1	
Ditto for hydrocele, ...	21	0	21	
Minor Surgical operations, ...	40	0	40	

Medical College:
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. t.

(U.) *Return of Surgical Operations performed by* PROFESSOR RALEIGH, *at the Medical College Hospital from 1st May 1844 to 30th April 1845.*

Nature of Operations	Number.	Result. Died.	Result. Discharged cured.	Remarks
Amputations of the arm,	3	0	3	
Ditto of the arm at the shoulder-joint,	1	0	1	
Ditto of the leg,	2	0	2	
Hypertrophical scrotums removed,	6	0	6	The largest weighing 50 lbs.
Large encysted tumors from various parts of the body,	5	0	5	
Ditto Fungoid ditto ditto,	3	0	3	
Luxations of the hip-joint reduced,	3	0	3	
Ditto of the shoulder-joint,	5	0	5	
Operations for hydrocele,	24	0	24	
Excision of cancerous breast,	1	0	1	
External iliac artery tied for femoral aneurism,	1	0	1	
Minor surgical operations,	30	0	30	
Total,	84	0	84	

MEDICAL COLLEGE:
April, 1847

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *u.*

(V.) *Annual Return of Surgical Operations performed by* PROFESSOR R. O'SHAUGHNESSY, *at the Medical College Hospital, from the* 1*st of January to the* 31*st December*, 1845.

Nature of Operations.	Result. Number.	Died.	Discharged.	Remarks.
Amputations of the leg, .	5	1	4	The fatal case occurred in a man whose constitution had been previously much debilitated from the effects of an extensive, sloughing ill conditioned ulcer, encircling the lower part of the leg Amputation was resorted to as affording him the last and only chance of recovery
Ditto of the arm, .. .	3	1	2	The fatal case occurred from the bursting of a fowling piece, the hand was shattered to pieces. Amputation was performed above the wrist, and the stump was healing favourably, when extensive suppuration took place about the elbow-joint, the bones of which were found to be extensively diseased, and the patient sank under the effects of irritative fever
Ditto of the foot, ...	2	1	1	The fatal case here occurred in a very aged man who was run over by a carriage : the patient died of tetanus, the result of the injury.
Hypertrophied tumors of the scrotum removed, ...	6	1	5	The fatal case was in a debilitated man subject to spleen disease, who died of fever after the wound had been nearly healed
Large tumors removed from various parts of the body, .. .	9	1	8	The death was in a case of extensive osteo-sarcomatous tumour, occupying the anterior part of the chest and neck, and extending from the right mamma up to the angle of the lower jaw . the patient sank under the shock of the operation.
Excision of cancerous breast, ...	1	0	1	
External iliac artery tied for aneurism,	1	1	0	Died from peritoneal inflammation caused by sloughing of the aneurismal sac.
Femoral artery ditto ditto, . Anterior tibial artery ditto ditto, .	1 1	1	0	Both operations were performed on the same individual. The anterior tibial artery was first tied for aneurism of that vessel on the dorsum of the foot, but the anastamosing branches of the posterior tibial and peroneal arteries communicated so freely with the aneurismal tumor, that recourse was obliged to be had to tying the femoral. The patient was a weakly subject, and of a bad habit of body, and ultimately died from hæmorrhage produced by sloughing of the femoral vein.
Operations for strangulated hernia, .	2	2	0	One a very aged bed-ridden man, died from sloughing of the integuments of the abdomen, originating in a bad sore on the sacrum; the other was brought to hospital in a dying state from mortification of the intestine
Bladder punctured for permanent stricture of the urethra, .	2	2	0	Both cases admitted in a dying state from infiltration of urine
Lithotomy, ...	5	0	5	
Luxations of the arm reduced, .	4	0	4	
Ditto of the hip reduced, .	3	0	3	
Operations for hare-lip, .	1	0	1	
Ditto for hydrocele, ...	28	0	28	
Minor operations, ...	40	0	40	
Total, .. .	114	11	102	

MEDICAL COLLEGE.
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *v.*

(W.) *Annual Return of Surgical Operations performed by* PROFESSOR R. O'SHAUGHNESSY, *at the Medical College Hospital, from the 1st of January to the 31st of December*, 1846.

Nature of Operations	Number.	Result. Died	Result. Discharged cured	Remarks
Amputations of arm, ...	2	0	2	
Ditto of the leg, ...	2	2	0	Both cases occurred in old feeble men, who were run over by carriages in the streets, and sank under the effects of their injuries.
Hypertrophied tumors of the scrotum removed,	3	0	3	The largest of these weighed 40 lbs.
Large encysted tumors from various parts of the body, ...	5	0	5	
Extirpation of the lower jaw for osteo-sarcoma,	1	0	1	
Excision of cancerous breast, ...	1	0	1	
Resection of the wrist-joint for caries of the bone, ...	1	0	1	
Carotid artery tied for aneurism, . ..	1	1*	1	* The patient was an old enfeebled subject, with a large aneurismal tumor on the left side of the neck below the bifurcation of the artery sloughing of the aneurismal sac took place ten days after the operation, involving the internal jugular vein, which subsequently gave way, and the patient sank from hemorrhage.
Operation, for strangulated hernia, ...	4	1	3	The fatal case occurred in an old man admitted in a moribund state from mortification of the intestine, which was irreducible in consequence of old and firm adhesions along the whole course of the sac.
Bladder punctured for permanent stricture of the urethra, ...	2	0	2	
Lithotomy, ...	11	1	10	This patient died of jaundice, caused by the impaction of gallstones in the ductus communis choledocus.
Tracheotomy, ...	1	1	0	Occurred in a young child, who had swallowed a custard apple-seed which made its way through the larynx down into the trachea, the seed was expelled through the wound immediately after the operation, but the child died three days afterwards from severe bronchial inflammation
Trephining fractured skulls for depression. ...	2	2	0	Compound fractures of the skull with depression of bone and extensive laceration of the brain.
Operations for cataract, ...	17	0	17	
Luxations of the arm reduced, ...	8	0	8	
Ditto of the hip reduced, ...	10	0	9	One case of two months standing, resisted every attempt at reduction; the others were recent, and easily reduced.
Operations for hydrocele, ...	23	0	23	
Minor operations, ...	50	0	50	Including amputation of fingers and toes, hypertrophied prepuce, operation for phymosis fistula in ano, the removal of condylomatous and hœmorrhoidal tumors, &c. &c.
Total,	144	8	136	

MEDICAL COLLEGE :
January, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *w.*

(X.) ***Annual Return of Diseases treated in the out-door Dispensary of the Medical College, from 1st of May 1843 to 30th of April 1844.***

Diseases.			Remained.	Admitted	Total	Cured	Relieved.	Absconded.	Died.	Remaining	Remarks.
Of the digestive function,	Colica,		0	31	31	12	11	8	0	0	
	Diarrhœa,		1	593	594	528	28	38	0	0	
	Cholera Biliosa,		0	9	9	6	0	3	0	0	
	Cholera Spasmodica,		0	9	9	7	0	2	0	0	
	Icterus,		0	21	21	17	1	3	0	0	
Of the respiratory function,	Asthma,		1	15	16	0	9	6	0	1	
Of the sanguineous function,	Febris,	Intermittens,	0	40	40	33	2	5	0	0	
		Continua,	0	52	52	41	1	8	0	2	
	Phlegmon et abscessus,		5	623	628	593	6	14	0	15	
	Inflammation,	Cephalica,	0	13	13	7	4	2	0	0	
		Thoracica,	0	11	11	7	3	1	0	0	
		Enteritica,	0	20	20	16	2	2	0	0	
	Hepatitis,	Acuta,	0	23	23	10	6	4	0	3	
		Chronica,	0	84	84	57	13	13	0	1	
	Splenitis,		1	227	228	156	50	18	0	4	
	Ophthalmia,	Acuta,	0	42	42	35	2	2	0	3	
		Chronica,	0	149	149	139	6	4	0	0	
	Catarrhus,		1	107	108	97	3	8	0	0	
	Dysenteria,	Acuta,	5	85	90	72	4	10	0	4	
		Chronica,	2	304	306	251	9	34	0	12	
	Rheumatismus	Acutus,	6	130	136	107	12	12	0	5	
		Chronicus,	0	506	506	429	25	43	0	9	
	Variola,		0	6	6	4	1	0	0	1	
	Scrofula,		0	14	14	11	0	2	0	1	
	Syphilis,	Primitiva,	0	93	93	67	15	8	0	3	
		Consecutiva,	8	569	577	510	18	34	0	15	
	Elephantiasis,		1	13	14	1	12	0	0	1	
	Scorbutus,		0	1	1	0	1	0	0	0	
	Ulcus,		0	3,205	3,205	3,137	21	36	0	11	
Of the nervous function,	Mania,		0	5	5	3	2	0	0	0	
	Cataracta,		0	16	16	10	4	2	0	0	
	Apoplexia,		0	4	4	3	1	0	0	0	
	Paralysis,		0	27	27	11	13	2	0	1	
Of the sexual function,	Gonorrhœa,		1	654	655	465	145	32	0	12	
Of the excernent function,	Tumors,	Bronchocele,	0	1	1	1	0	0	0	0	
	Hydrops,	Anasarca,	0	27	27	17	7	3	0	0	
		Ascites,	0	8	8	3	3	2	0	0	
		Hydrocele,	0	68	68	54	12	1	0	1	
	Dysuria,		0	7	7	6	0	1	0	0	
	Lepra,		0	36	36	15	10	9	0	2	
	Psora et Herpes,		0	4,399	4,399	4,278	28	56	0	37	
Of external violence,	Contusio,		0	29	29	23	3	3	0	0	
	Vulnus,		0	3	3	3	0	0	0	0	
	Ambustio,		0	4	4	2	1	0	0	1	
	Fractura,		0	15	15	7	7	0	0	1	
Total,			32	12,298	12,330	11,250	501	431	0	146	

MEDICAL COLLEGE :
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *x*.

(Y.) *Annual Return of Diseases treated in the out-door Dispensary of the Medical College, from 1st May 1844 to 30th April, 1845.*

	Diseases.	Remained.	Admitted.	Total.	Cured.	Relieved.	Absconded.	Died.	Remaining.	Remarks.
Of the digestive function.	Colica,	0	19	19	0	13	5	0	1	
	Diarrhœa,	2	330	332	267	8	55	0	2	
	Cholera Biliosa,	0	0	0	0	0	0	0	0	
	Cholera Spasmodica,	0	0	0	0	0	0	0	0	
	Icterus,	0	22	22	16	0	6	0	0	
Of the respiratory function.	Asthma,	1	11	12	0	7	4	0	1	
Of the sanguineous function.	Febris, Intermittent,	0	12	12	11	0	1	0	0	
	Febris, Continued,	2	71	73	50	1	20	0	2	
	Phlegmon et abscessus,	15	844	859	770	0	83	0	6	
	Inflammatio, Cephalica,	0	0	0	0	0	0	0	0	
	Inflammatio, Thoracica,	0	0	0	0	0	0	0	0	
	Inflammatio, Enteritica,	0	0	0	0	0	0	0	0	
	Hepatitis, Acuta,	3	25	28	15	6	7	0	0	
	Hepatitis, Chronica,	1	36	37	27	4	6	0	0	
	Splenitis,	4	105	109	49	47	15	0	2	
	Opthalmia, Acuta,	3	42	45	40	1	3	0	1	
	Opthalmia, Chronica,	0	168	168	141	0	27	0	0	
	Catarrhus,	0	94	94	87	0	7	0	0	
	Dysenteria, Acuta,	4	106	110	69	16	23	0	2	
	Dysenteria, Chronica,	12	237	249	147	55	45	0	2	
	Rheumatismus, Acutus,	5	104	109	56	35	16	0	2	
	Rheumatismus, Chronicus,	9	353	362	268	38	52	0	4	
	Variola,	1	0	1	1	0	0	0	0	
	Scrofula,	1	1	2	0	2	0	0	0	
	Syphilis, Primitiva,	3	81	84	52	23	8	0	1	
	Syphilis, Consecutiva,	15	398	413	285	53	70	0	5	
	Elephantiasis,	1	10	11	1	8	2	0	0	
	Scorbutus,	0	0	0	0	0	0	0	0	
	Ulcus,	11	1,338	1,349	1,237	13	92	0	7	
Of the nervous function.	Mania,	0	4	4	1	3	0	0	0	
	Cataracta,	0	2	2	0	2	0	0	0	
	Apoplexia,	0	0	0	0	0	0	0	0	
	Paralysis,	0	7	7	0	5	1	0	1	
Of the sexual function.	Gonorrhœa,	12	832	844	533	218	89	0	4	
Of the excernent function	Tumors, Bronchocele,	0	6	6	2	3	1	0	0	
	Hydrops, Anasarca,	0	15	15	12	3	0	0	0	
	Hydrops, Ascites,	0	11	11	8	1	2	0	0	
	Hydrops, Hydrocele,	1	55	56	34	15	5	0	2	
	Dysuria,	0	5	5	4	0	1	0	0	
	Lepra,	2	2	4	0	3	1	0	0	
	Psora et Herpes,	37	4,782	4,819	4,656	0	137	0	26	
Of external violence.	Contusio,	0	11	11	8	0	3	0	0	
	Vulnus,	0	0	0	0	0	0	0	0	
	Ambustio,	1	7	8	7	1	0	0	0	
	Fractura,	0	15	15	9	5	1	0	0	
Total,		146	10,161	10,307	8,863	589	788	0	71	

MEDICAL COLLEGE :
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XIV. *y.*

(*Z.*) *Annual Return of Diseases treated at the out-door Dispensatory of the Medical College, from 1st January to 31st December, 1845.*

	Diseases.	Remained.	Admitted.	Total	Cured.	Relieved.	Absconded.	Died.	Remaining.	Remarks.
1	Zymotic Diseases, ...	45	4,333	4,378	4,022	187	143	0	26	
2	Sporadic diseases of uncertain or variable seat, ...	21	1,421	1,442	1,168	194	74	0	6	
3	Of the Nervous System, ...	0	98	98	14	60	24	0	0	
4	Of the Respiratory Organs, ...	3	542	545	469	55	10	0	11	
5	Of the Organs of Circulation, . ..	0	0	0	0	0	0	0	0	
6	Of the Digestive Organs, ...	2	741	743	431	238	66	0	8	
7	Of the Urinary Organs, . ..	0	89	89	85	4	0	0	0	
8	Of the Organs of Generation, ...	0	83	83	83	0	0	0	0	
9	Of the Organs of Locomotion, .. .	2	1,878	1,880	1,275	534	56	0	15	
10	Of the Integumentary System, . .	66	4,551	4,617	4,407	147	58	0	5	
11	Old Age, ...	0	0	0	0	0	0	0	0	
12	External causes, Poisoning, Asphyxia, Injuries, &c., ...	0	536	536	527	0	0	0	9	
	1.									
1	Small-pox, ...	0	0	0	0	0	0	0	0	
2	Measles, ...	0	0	0	0	0	0	0	0	
3	Scarlatina, ...	0	0	0	0	0	0	0	0	
4	Hooping Cough, .	0	0	0	0	0	0	0	0	
5	Croup, ...	0	0	0	0	0	0	0	0	
6	Thrush, ...	0	16	16	16	0	0	0	0	
7	Diarrhœa, . .	3	500	503	503	0	0	0	0	
8	Dysentery, ...	7	805	812	652	112	37	0	11	
9	Cholera, ...	0	103	103	0	75	28	0	0	
10	Influenza, ...	0	0	0	0	0	0	0	0	
11	Ague, ...	0	560	560	557	0	0	0	3	
12	Remittent Fever, ...	0	17	17	17	0	0	0	0	
13	Common Continued Fever, . ..	21	522	543	460	0	78	0	5	
14	Erysipelas, .. .	0	24	24	24	0	0	0	0	
15	Syphilis, ...	14	1,786	1,800	1,793	0	0	0	7	
16	Hydrophobia, ...	0	0	0	0	0	0	0	0	
	2.									
17	Inflammation, . ..	0	254	254	175	47	28	0	4	
18	Hœmorrhage, ...	0	0	0	0	0	0	0	0	
19	Dropsy, ...	0	263	263	120	99	42	0	2	
20	Abscess, ...	21	806	827	827	0	0	0	0	
21	Mortification, ...	0	10	10	6	0	4	0	0	
22	Purpura, ...	0	0	0	0	0	0	0	0	
23	Scrofula, ...	0	36	36	0	36	0	0	0	
24	Carcinoma, ...	0	0	0	0	0	0	0	0	
25	Tumours, ...	0	52	52	40	12	0	0	0	
26	Gout, ...	0	0	0	0	0	0	0	0	
27	Atrophy, ...	0	0	0	0	0	0	0	0	
28	Debility	0	0	0	0	0	0	0	0	
29	Malformations, ...	0	0	0	0	0	0	0	0	
30	Sudden deaths, ...	0	0	0	0	0	0	0	0	
	Carried forward, ...	205	20,026	20,231	17,671	1,800	648	0	112	

No. XIV. *y.—(Continued.)*

(Z.) *Annual Return of Diseases treated at the out-door Dispensatory of the Medical College, from 1st January to 31st December,* 1845.—(Continued.)

Diseases.	Remained.	Admitted.	Total.	Cured.	Relieved.	Absconded.	Died.	Remaining.	REMARKS.
Brought forward, ...	205	20,026	20,231	17,671	1,800	648	0	112	
3.									
31 Cephalitis,	0	14	14	14	0	0	0	0	
32 Hydrocephalus,	0	5	5	0	5	0	0	0	
33 Apoplexy,	0	0	0	0	0	0	0	0	
34 Paralysis,	0	54	54	0	38	16	0	0	
35 Convulsions,	0	0	0	0	0	0	0	0	
36 Tetanus,	0	3	3	0	3	0	0	0	
37 Chorea, ..	0	0	0	0	0	0	0	0	
38 Epilepsy,	0	10	10	0	10	0	0	0	
39 Insanity,	0	12	12	0	4	8	0	0	
40 Delirium Tremens,	0	0	0	0	0	0	0	0	
41 Brain, &c., diseases of ..	0	0	0	0	0	0	0	0	
4.									
42 Laryngitis,	0	4	4	4	0	0	0	0	
43 Quinsey,	0	0	0	0	0	0	0	0	
44 Bronchitis,	0	326	326	316	0	0	0	10	
45 Pleurisy,	0	94	94	94	0	0	0	0	
46 Pneumonia,	0	22	22	22	0	0	0	0	
47 Hydrothorax,	0	0	0	0	0	0	0	0	
48 Asthma,	1	30	31	0	31	0	0	0	
49 Phthisis, ..	0	0	0	0	0	0	0	0	
50 Lungs, &c., diseases of	2	66	68	30	24	10	0	4	
5.									
51 Pericarditis,	0	0	0	0	0	0	0	0	
52 Aneurism,	0	0	0	0	0	0	0	0	
53 Heart, &c. diseases of ..	0	0	0	0	0	0	0	0	
6.									
54 Teething,	0	22	22	0	22	0	0	0	
55 Gastritis,	0	0	0	0	0	0	0	0	
56 Enteritis,	0	10	10	7	0	3	0	0	
57 Peritonitis,	0	6	6	6	0	0	0	0	
58 Tabes Mesenterica,	0	0	0	0	0	0	0	0	
59 Worms,	0	40	40	40	0	0	0	0	
60 Ascites,	0	78	78	0	52	26	0	0	
61 Ulceration,	0	0	0	0	0	0	0	0	
62 Hernia, ..	0	10	10	0	10	0	0	0	
63 Colic or Ileus,	0	153	153	153	0	0	0	0	
64 Intussusception,	0	0	0	0	0	0	0	0	
65 Stricture,	0	0	0	0	0	0	0	0	
66 Hæmatemesis, ..	0	0	0	0	0	0	0	0	
67 Stomach, &c. diseases of	0	35	35	35	0	0	0	0	
Carried forward,	208	21,020	21,228	18,392	1,999	711	0	126	

No. XIV. *y.*—(*Continued.*)

(Z.) *Annual Return of Diseases treated at the out-door Dispensatory of the Medical College, from 1st January to 31st December,* 1845.—(Continued.)

Diseases.	Remained.	Admitted.	Total.	Cured.	Relieved.	Absconded.	Died.	Remaining.	Remarks.
Brought forward,	208	21,020	21,228	18,392	1,999	711	0	126	
7									
68 Pancreas, diseases of	0	0	0	0	0	0	0	0	
69 Hepatitis,	0	11	11	11	0	0	0	0	
70 Jaundice,	0	55	55	55	0	0	0	0	
71 Liver, diseases of	0	40	40	40	0	0	0	0	
72 Spleen, diseases of	2	281	283	84	154	37	0	8	
73 Nephritis,	0	3	3	3	0	0	0	0	
74 Ischuria,	0	0	0	0	0	0	0	0	
75 Diabetes,	0	4	4	0	4	0	0	0	
76 Cystitis,	0	0	0	0	0	0	0	0	
77 Stone,	0	3	3	3	0	0	0	0	
78 Stricture,	0	58	58	58	0	0	0	0	
79 Kidneys, &c., diseases of	0	21	21	21	0	0	0	0	
8.									
80 Childbirth,	0	0	0	0	0	0	0	0	
81 Paramenia,	0	48	48	48	0	0	0	0	
82 Ovarian Dropsy,	0	0	0	0	0	0	0	0	
83 Organs of Generation, diseases of	0	35	35	35	0	0	0	0	
9.									
84 Arthritis,	0	0	0	0	0	0	0	0	
85 Rheumatism,	2	1,805	1,807	1,240	508	44	0	15	
86 Joints, &c., diseases of	0	73	73	35	26	12	0	0	
10.									
87 Carbuncle,	0	16	16	16	0	0	0	0	
88 Phlegmon,	0	54	54	54	0	0	0	0	
89 Ulcer,	16	1,230	1,246	1,244	0	0	0	2	
90 Fistula,	0	37	37	37	0	0	0	0	
91 Skin, &c., diseases of	50	3,214	3,264	3,056	147	58	0	3	Lepra, 101; Herpes, 1,118; Psora, 2,045; 3,264
11.									
92 Intemperance,	0	0	0	0	0	0	0	0	
93 Starvation,	0	0	0	0	0	0	0	0	
94 Violent deaths,	0	0	0	0	0	0	0	0	
Causes not specified.									
95 Contusions,	0	307	307	305	0	0	0	2	
96 Wounds	0	147	147	143	0	0	0	4	
97 Fractures,	0	22	22	19	0	0	0	3	
98 Dislocations,	0	25	25	25	0	0	0	0	
99 Concussio cerebri,	0	0	0	0	0	0	0	0	
100 Burns and scalds,	0	35	35	35	0	0	0	0	
Total,	278	28,544	28,822	24,959	2,838	862	0	163	

MEDICAL COLLEGE:
April, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

No. XV. z.

(Z.[2]) *Annual Report of Diseases treated in the out-door Dispensary of the Medical College, from 1st January to 31st December, 1846.*

	Diseases.	Remained	Admitted	Total.	Discharged cured.	Relieved.	Absconded	Died.	Remaining.	Remarks.
1	Zymotic diseases,	26	6036	6062	5453	561	0	0	48	
2	Sporadic Diseases of uncertain or variable seat,	6	1261	1267	987	264	0	0	16	
3	Of the Nervous System,	0	107	107	40	44	22	0	1	
4	Of the Respiratory Organs,	11	819	830	586	235	0	0	9	
5	Of the Digestive Organs,	8	907	915	647	262	0	0	6	
6	Of the Urinary Organs,	0	154	154	114	40	0	0	0	
7	Of the Organs of Locomotion,	15	4204	4219	3075	1132	0	0	12	
8	Of the Integumentary System,	5	4781	4786	4754	0	0	0	32	
9	External causes, poisoning, asphyxia, injuries, &c ,	9	854	863	826	28	0	0	9	
	1									
1	Croup,	0	46	46	46	0	0	0	0	
2	Thrush,	0	25	25	25	0	0	0	0	
3	Diarrhœa,	0	478	478	478	0	0	0	0	
4	Dysentery,	11	880	891	640	240	0	0	11	
5	Cholera,	0	191	191	0	191	0	0	0	
6	Ague,	3	463	466	461	0	0	0	5	
7	Remittent Fever,	0	358	358	222	130	0	0	6	
8	Common Continued Fever,	5	636	641	634	0	0	0	7	
9	Erysipelas,	0	22	22	22	0	0	0	0	
10	Syphilis,	7	2937	2944	2925	0	0	0	19	
	2									
11	Inflammation,	4	652	656	649	0	0	0	7	
12	Dropsy,	2	321	323	285	38	0	0	0	
13	Mortification,	0	7	7	7*	0	0	0	0	* Mostly of the toes, in old enfeebled subjects.
14	Scrofula,	0	226	226	0	219	0	0	7	
15	Carcinoma,	0	4	4	0	4	0	0	0	
16	Tumors,	0	46	46	46	0	0	0	0	
17	Atrophy,	0	5	5	0	5	0	0	0	
	3									
18	Hydrocephalus,	0	3	3	0	3	0	0	0	
19	Paralysis,	0	66	66	40	25	0	0	1	
20	Tetanus,	0	8	8	0	0	8†	0	0	† Result unknown.
21	Epilepsy,	0	16	16	0	16	0	0	0	
22	Insanity,	0	14	14	0	0	14	0	0	
	4									
23	Bronchitis,	7	500	507	380	120	0	0	0	
24	Pleurisy,	0	186	186	186	0	0	0	0	
25	Pneumonia,	0	20	20	20	0	0	0	0	
26	Asthma,	0	50	50	0	48	0	2	0	
27	Phthisis,	0	19	19	0	19	0	0	0	
28	Lungs, &c , diseases of	4	44	48	0	48	0	0	0	
	Carried forward,	123	27,346	27,469	23,448	3,672	46	0	196	

No. XV. z.—(Continued.)

(Z.) *Annual Report of Diseases treated in the out-door Dispensary of the Medical College, from 1st January to 31st December, 1846.*—(Continued.)

	Diseases.	Remained.	Admitted.	Total.	Discharged, cured.	Relieved.	Absconded.	Died.	Remaining.	Remarks
	Brought forward,	123	27,346	27,469	23,448	3,672	46	0	196	
	5									
29	Teething,	0	40	40	40	0	0	0	0	
30	Enteritis,	0	19	19	0	19	0	0	0	
31	Peritonitis,	0	18	18	0	18	0	0	0	
32	Tabes Mesenterica,	0	10	10	0	10	0	0	0	
33	Worms,	0	70	70	70	0	0	0	0	
34	Ascites,	0	51	51	0	51	0	0	0	
35	Hernia,	0	10	10	0	10	0	0	0	Simply cases of incarcerated hernia, reduced by the taxis.
36	Colica or Ileus,	0	182	182	182	0	0	0	0	
37	Hepatitis,	0	83	83	83	0	0	0	0	
38	Jaundice,	0	35	35	35	0	0	0	0	
39	Spleen, diseases of	8	389	397	237	154	0	0	6	
	6									
40	Nephritis,	0	6	6	6	0	0	0	0	
41	Ischuria,	0	58	58	58	0	0	0	0	
42	Diabetes,	0	4	4	0	4	0	0	0	Transferred to hospital for operation.
43	Stone,	0	11	11	0	11	0	0	0	
44	Strictura,	0	25	25	0	25	0	0	0	
45	Kidneys, &c., diseases of	0	50	50	50	0	0	0	0	
	7									
46	Rheumatism,	15	4104	4119	3011	1096	0	0	12	
47	Joints, &c., diseases of	0	100	100	64	36	0	0	0	
	8									
48	Carbuncle,	0	30	30	30	0	0	0	0	
49	Phlegmon,	0	1437	1437	1429	0	0	0	8	
50	Ulcers,	2	1920	1922	1912	0	0	0	10	
51	Fistula,	0	63	63	63	0	0	0	0	
52	Skin, &c., diseases of	3	1331	1334	1320	0	0	0	14	Mostly cases of Lepra Vulgaris, Elephantiasis, Psora, and Herpes.
53	Causes not specified,	0	28	28	0	28*	0	0	0	* Diseases of the eye.
54	Contusions,	2	267	269	266	0	0	0	3	
55	Wounds,	4	175	179	176	0	0	0	3	
56	Fractures,	3	61	64	61	0	0	0	3	
57	Dislocations and subluxations	0	226	26	226	0	0	0	0	
58	Burns and Scalds,	0	97	97	97	0	0	0	0	
	Total,	160	18,246	38,206	32,864	5,134	46	0	255	

MEDICAL COLLEGE:
1st January, 1847.

FRED. J. MOUAT, M. D.,
Secretary

No. XIV. zz.

(Z^3.) *Tabular Statement of the number of Patients treated in the out-door Dispensary of the Medical College, during each month of the Years 1845 and 1846.*

Number.	Months.	1845.	1846.	Remarks.		
				Of the numbers mentioned in the preceding columns there attended in	1845.	1846.
				Once,*	8546	8137
				Twice,	2778	2897
				Thrice,	1499	1820
1	January,	797	1589	Four times,	724	1368
2	February,	525	1573	Five, ,,	340	1093
3	March,	784	1907	Six, ,,	243	931
4	April,	735	1623	Seven, ,,	181	812
5	May,	851	1571	Eight, ,,	130	628
6	June,	1205	1540	Nine, ,,	45	504
7	July,	1653	1668	Ten, ,,	23	413
8	August,	1858	1707	Eleven, ,,	23	277
9	September,	1710	1402	Twelve, ,,	7	216
10	October,	1457	1437	Thirteen, ,,	0	105
11	November,	1560	1540	Fourteen, ,,	12	0
12	December,	1417	1566	Fifteen, ,,	1	2
	Total,	14,552	19,123	Total,	14,552	19,203

MEDICAL COLLEGE:
1st January, 1847.

FRED. J. MOUAT, M. D.,
Secretary.

* All very severe cases, whether medical or surgical, requiring prolonged treatment and constant attendance, are transferred, at once, to the College Hospital.

No. XV.

No. 724.

FROM THE SECRETARY COUNCIL OF EDUCATION,

To J. MORRIS, ESQ.,

Secretary Municipal Committee.

Fort William, May 25th, 1847.

SIR,

In reply to your letter dated 23rd instant, I beg leave to acknowledge the receipt of two Union Bank Books, together with the receipts of the unpaid contributions to the Fever Hospital, of which the statement,* which accompanied your letter, is duly signed and returned.

* Marked No. XV. *a.*

I have the honor to be,

Sir,

Your most obedient Servant,

FRED. J. MOUAT, M. D.,

Secretary.

No. XV. *a.*

Received from Mr. JAMES MORRIS, Clerk to the Committee upon the Fever Hospital and Municipal Improvements, the following, viz.—

			Donations.			Subscriptions.			Total.		
			Co.'s R	A	P.	Co.'s Rs.	A.	P.	Co.'s Rs.	A.	P.
Two, ...	2	Union Bank Books, Nos. 1 and 2, containing the cash transactions of that Bank with the Fever Hospital Committee, from the 28th March, 1836 to 22nd May, 1847, amounting (inclusive of Sicca Rupees 7,000 or Co.'s Rs. 7,466 : 10 : 8 in Government Securities) to Net Company's Rupees, ...	....		....	....		....	61,248	7	10
Seven, ...	7	Receipts† as per list annexed, marked *A.* of Native Contributors to the Fever Hospital, who refuse to pay till the Hospital is established, ...	2,453	5	4	11	0	0			
Six, ...	6	Ditto ditto marked *A.A* of the like kind of Christian ditto ditto, ..	21	0	0	166	0	0			
Eleven	11	Ditto ditto marked *B* of Native Contributors to the Fever Hospital who put off payment from day to day, ...	3,084	7	5	1	0	0			
Twenty-three,	23	Ditto ditto marked *B. B.* of the like kind of Christian ditto ditto,	128	0	0	51	0	0			
Two, ...	2	Ditto ditto marked *C.* of Native Contributors to the Fever Hospital, the payment of whose contributions is doubtful (the Bills were with Baboo Ramcomul Sein, (since *Dead*) but enquire of his son Hurreemohun Sein at Bank of Bengal,)	106	10	8	0	0	0			
Four, ...	4	Ditto ditto marked *C. C* of the like kind of Christian ditto ditto,	10	0	0	8	0	0			
Five, ...	5	Ditto ditto marked *D.* of Native Contributors to the Fever Hospital who refuse to pay, ...	26	0	0	8	0	0			
Forty-eight, ..	48	Ditto ditto marked *D.D.* of the like kind of Christian ditto ditto,	217	0	0	25	0	0			
Twelve, ...	12	Ditto ditto marked *E.* of Native Contributors to the Fever Hospital absent from Calcutta, ...	93	0	0	17	0	0			
Twenty-two, ..	22	Ditto ditto marked *E.E* of the like kind of Christian ditto ditto,	107	0	0	5	0	0			
Three, ...	3	Ditto ditto marked *F.* of Native Contributors to the Fever Hospital whose offices or places of residence have not been discovered, ...	7	0	0	0	0	0			
Nine, ...	9	Ditto ditto marked *F.F.* of the like kind of Christian ditto ditto, ..	20	0	0	0	0	0			
Two, ...	2	Ditto ditto marked *G.* of Native Contributors to the Fever Hospital *Demised,*	2	0	0	2	0	0			
Twelve, ...	12	Ditto ditto marked *G.G.* of the like kind of Christian ditto ditto,	91	0	0	15	0	0			
		Add 4 pie omitted to be paid by two individuals, ...	0	0	4	0	0	0			
			6,366	7	9	309	0	0	6,675	7	9
		Total Co.'s Rupees, ...	....			....		....	67,923	15	7

NOTE.—No further efforts have been made to realize the above sums since the 1st May 1839, when the Fever Hospital Accounts were closed and the Establishment discharged. See Statement in Appendix (F) page 288—to the Municipal Committee's Report, and it is apprehended that a great part of the above sums cannot be realized.

J. MORRIS,

Clerk to the Municipal Committee.

[† Delivered to Doctor Mouat, to be by him presented for the recovery of the sums therein mentioned.—J. M.]

MUNICIPAL OFFICE, TOWN HALL:
22nd May, 1847.

FRED. J. MOUAT, M. D.,
Secretary Council of Education.

No. XVI.

No. 3098.

To W. BRACKEN, ESQ.,
Collector of Customs

SIR,

Two questions which were suggested by the late Mr. McFarlan, Chief Magistrate of Calcutta, as deserving the consideration of Government, were by the Government referred to the Municipal Committee, of which I have the honour to be Chairman, to Report upon, viz.

First.—The passing of a Law for the Regulation of Ferry Boats plying between Calcutta and the opposite Bank of the River.

Secondly.—The passing of a Law to prevent the Obstruction of Public Ghauts within the limits of Calcutta by Boats remaining a long time in front of them.

Mr. Patton the present Chief Magistrate has suggested to the Committee that the sort of investigation, which it would be proper to institute, in order to Report upon these questions, would be the examination of those who frequent the River, and thus have opportunities of witnessing the accidents that commonly occur, and might offer useful suggestions upon the subject, and that such persons he presumes may be found in your Office.

The Committee will therefore feel much obliged to you if you can yourself afford them any information upon the subjects noticed below, and procure from any persons in your Office or connected with it, answers which may be depended upon to the following Queries—

First.—In reference to Ferry Boats.

1. Whether there are any, or what fixed Ghauts on this side of the River from which Boats ply for the purpose of taking passengers, in such numbers as may offer, to the other side, and may thus be considered as Public Ferry Boats?

2. Whether there are any fixed times at which passage in such Boats can be obtained, and fixed customary fares?

3. Whether there is any customary regulation in regard to the number of persons admitted into the Boats with reference to their size?

4. Whether the Boats which now ply for the above purpose are good and sufficient, and well appointed in tackle and hands?

5. Whether from the want of Regulations on the above subjects accidents frequently occur attended with loss of life and property?

6. Whether it would be expedient that Boats allowed to ply as Public Ferry Boats should be Numbered and Registered; and the name of the owner Registered likewise, and the number of the Boat, name of the owner, together with the number of passengers it is permitted to carry, should be painted in legible characters in some conspicuous part of the Boat?

7. What other Regulations it would be expedient to enforce by Law upon the above matters?

8. What number of Ghauts, and at what stations, ought to be fixed for the departure of such Ferry Boats on the Calcutta side, and at what times of the Tide?

9. What number of Ghauts and at what stations ought to be fixed on the other side for the return of such Ferry Boats from thence to Calcutta, and at what times of the Tide?

To your answers to the above Queries, be pleased to add such further information or suggestions as appear to you useful.

Secondly.—The preventing Obstructions at Public Ghauts.

1. Whether there is any, and what amount of inconvenience or danger occasioned by the obstruction of these Ghauts from Boats remaining a long time in front of them, and whether any and what Regulations might be made to prevent such obstructions without interfering with the time necessary for landing passengers and cargo or for taking them on board.

Be pleased to add to your answer such information or suggestions as may appear to you useful on this head.

I have the honor to be,
Sir,
Your most obedient servant,
(Signed) J. P. GRANT,
Chairman of the Committee upon Municipal Improvements.

MUNICIPAL OFFICE, TOWN HALL:
16th March, 1847.

No. 3,099.

The like Letter addressed to CAPTAIN T. E. ROGERS,
Master Attendant and Superintendent of Marine.

No. 4,000.

The like Letter addressed to CAPTAIN E. ONSLOW,
Harbour Master.

No. 4,014.

The like Letter addressed to CAPTAIN W. BOOTHBY,
Surveyor of Shipping.

No. 4,022.

The like Letter addressed to CAPTAIN E OAKES,
Surveyor of Shipping.

No. 4,023.

The nearly like Letter addressed to CAPTAIN G. W. S. HICKS,
Superintendent of Police.

No. XVII.

No. 499.

To THE HONORABLE SIR JOHN PETER GRANT, KT,
Chairman of the Committee upon Municipal Improvements.

HONORABLE SIR,

I have the honor to acknowledge the receipt of your Letter No. 3098, dated 16th instant, requesting me to furnish any information I can on the subject to which your communication refers, and setting forth certain questions, to which you desire a special reply may be made.

2nd. Personally, I must confess entire ignorance, and utter inability to offer any suggestions on the subject under consideration. But I have been glad to avail myself of

the knowledge, in this respect, of an intelligent officer attached to this Department, Mr. E. O'Brien, the Head Inspector of the Preventive Service; and whose situation also, as Supervisor of Dhonees, has afforded him opportunities of acquiring information that may be depended on.

3rd. In reply therefore to your letter, I have the honor to submit that officer's remarks and replies *seriatim* to the questions put, in original. They seem to me well calculated to be of use to your Committee in their deliberations on the subject.

I have the honor to be,
Honorable Sir,
Your most obedient Servant,
W. BRACKEN,
Collector of Customs.

CALCUTTA GOVERNMENT CUSTOM HOUSE:
The 30th March, 1847.

No. XVII. *a.*

To W. BRACKEN, ESQ.,
Collector of Customs.

SIR,

I have the honor, in compliance with your orders, to submit answers to the queries put by the Chairman of the Municipal Committee, relative to Ferry Boats from Calcutta to the opposite side of the River, and to the Obstruction of the Ghauts.

I have the honor to be,
Sir,
Your most obedient Servant,
E. O'BRIEN,
Inspector Preventive Service, and Superintendent of Dhonees.

CALCUTTA CUSTOM HOUSE:
The 26th March, 1847.

No. XVII. *a.*(1)

Replies to Queries.

A. 1. The only Ferry Ghauts on this side of the River are Neemtollah, Armenian and Colvin's Ghauts; the corresponding Ghauts on the other side are Sulkeah, Howrah, and Ramkistopore Ghauts. Boats are available at all times from daylight in the morning, till 10 o'clock at night, and sometimes later in fine weather. The ordinary fare is half a pice for each individual in the open Ferry Boats, that carry from 40 to 50 persons each, and one pice in the Dinghys, that carry from 20 to 25 men each.

A. 2. There is a rule fixing the number to each Boat, but from the want of an efficient check, it has become a dead letter. The open Ferry Boats registered to carry from 20 to 28 persons each, take on board from 40 to 50: and Dinghys registered to carry 10 to 12 persons, convey over 20 to 25.

A. 3. There is, but it is seldom if ever observed, the Manjees take as many as they can crowd into their respective Boats.

A. 4. The Boats plying for hire are, generally speaking, ill-manned, and otherwise ill-conditioned: but on this head the opinion of a nautical man would be valuable.

A. 5. Accidents frequently occur from the Boats being inconveniently crowded during the freshes, and when it is blowing hard. I have frequently at such times, seen the *gunwales* of the open Ferry Boats within half an inch of the water's edge. Loss of life, from the want of stringent regulations, very often occurs.

A. 6. All Boats, whether Ferry or plying for hire to take parties to and from ships, or from one part of the River to another, should be Numbered and Registered. Provided of course, means are devised to enforce the regulations in this regard. The present system, I speak from personal observation, is of no use whatever. It would, in my opinion, be advantageous to have the names of the Owner and Manjee, Number of the Boat, and the Number of persons it is licensed to carry, painted on a conspicuous part of the Boat.

A. 7. I can hardly venture to offer an opinion as to what would be most expedient. Perhaps it would be a good plan to take security from the Owners or Manjees of the Boats, or from both, and to punish by fine any infraction of the law.

A. 8 and 9. The Ghauts already mentioned in my reply to the 1st Query, are decidedly most convenient for the public. There does not appear to be any restrictions necessary as to time, except during spring flood-tides, and the height of the freshes.

Obstruction of the Ghauts.

I am not aware that there is any danger to be apprehended from the crowded state of the Ghauts, but there is very great inconvenience occasioned by their being blocked up by Steamers, Accommodation and Cargo Boats, as well as by Natives bathing at them. To obviate these, it would be necessary to establish the following or some other similar restrictions:

1st. Certain Ghauts to be set apart for the natives to perform their ablutions at.

2nd. Other Ghauts for Boats to load and unload at.

3rd. Other Ghauts for Boats to ply at for hire.

4th. To prevent Steamers, Accommodation Boats, &c. from making fast to the shore, by chains or warps;—also to make Boats lie *between*, and not *at* the Ghauts, whether laden or empty, and to leave a clear passage for Boats of all descriptions to pass up and down between the ships in the moorings and the shore, and also from the Burra Bazaar Ghaut to Hautkholah Ghaut, to keep a clear passage. It is absolutely necessary that something should be done to keep this part of the river from being blocked up, as it is at present, by Up-Country traders' Boats, and cargo Boats of all sizes and descriptions.

E. O'BRIEN,
Inspector Preventive Service, and
Superintendent of Dhonees.

CALCUTTA CUSTOM HOUSE:
The 30*th March*, 1847.

No. XVIII.

No. 1781.

To THE HONORABLE SIR J. P. GRANT,

Chairman of the Municipal Committee.

SIR,

I have the honor to acknowledge the receipt of your letters noted in the margin, both of the same tenor, soliciting information on several points connected with the actual system of the Ferry Boats plying between this City and the opposite side of the River, with a view to the introduction of improved Regulations calculated to better secure the safety of passengers and the public convenience, and also on reference to the prevention of Obstructions at Public Ghauts.

Nos. 3909 and 4021 of the 16th March & 14th April 1847.

2nd. In reply I am directed to inform you, that the Officiating Superintendent forwarded your letter to his address, No. 3099, to the Officiating Master Attendant, on the 24th ultimo, and is now awaiting his answer in order to address you on the subject, which he will have the honor of doing as soon as the Report called for reaches him, sending you a copy of it, and adding such suggestions as may occur to him on the important subject of your enquiry. In the mean time I may remark, that the Ferry Boats are not in any way under the control of this Department, and that the Officers of it have not in fact other or better means of obtaining information respecting them than other individuals, whose duties or avocations may require them to be frequently afloat; but they will nevertheless, it cannot be doubted, feel bound to use their best endeavours to procure all that may be useful for the purposes in view.

3rd. The Officiating Master Attendant's attention will be immediately called to my letter to him of the 24th ultimo, and he will be requested to reply to it as soon as he is in a condition to give the required information, on the various points referred to him.

I have the honor to be,

Sir,

Your most obedient Servant,

JAS. SUTHERLAND,

Secretary.

FORT WILLIAM,
MARINE SUPERINTENDENT'S OFFICE:
The 21st April, 1847.

No. XIX.

No. 1925.

To SIR JOHN PETER GRANT, KT.,

Chairman of the Municipal Committee.

SIR,

In continuation of my letter No. 1781, of the 21st instant, I have now by direction of the Officiating Superintendent of Marine, to forward you the accompanying copy of a Report No. 965, dated 24th idem, he has received from the Officiating Master Attendant relative to the Regulation of Ferry Boats, and to the means of preventing Obstructions at the Public Ghauts, and to communicate the few suggestions that have occurred to the Superintendent on the subject.

2nd. Of the proposal to register and license Boats plying on the river for freight or passage, the Officiating Superintendent entirely approves. In the 5th Para. of his letter Captain Clapperton proposes that the Registry Number, the weight and measurement of Boats plying on the river for freight, and the number of passengers the Ferry Boats might be licensed to carry, should be marked on the quarter of such Boats, the Superintendent would add on the main thwart also, where it can be seen by the passengers.

3rd. With regard to the proposal to keep the Ghauts clear, the Officiating Superintendent does not consider that much advantage would be derived from any arrangement of the kind, as he feels confident the Peon appointed to prevent the accumulation of Boats would be bribed; and he is of opinion that putting down posts for the purpose would be an evil, as they would become obstructions to Boats passing up and down in shore, that would be inconvenient and might be dangerous.

4th. In other respects the Superintendent concurs generally with Captain Clapperton, and can add nothing to the facts communicated in that Officer's letter.

I have the honor to be,
Sir,
Your most obedient Servant,
JAS. SUTHERLAND,
Secretary

FORT WILLIAM,
MARINE SUPERINTENDENT'S OFFICE :
The 30th April, 1847

No. XIX. *a.*

No. 965.

To J. SUTHERLAND, ESQ.,
Secretary to the Superintendent of Marine.

SIR,

I have the honor to acknowledge the receipt of your letter No. 1330, dated the 20th ultimo, forwarding copy of a letter No. 3099, dated the 16th ultimo, from the Chairman of the Municipal Committee, requesting me to reply as far as possible to the queries therein contained, and to afford the Superintendent such further information on the subject of Ferry Boats, etc. as may be in my power.

2nd. In reply to the 1st query with reference to Ferry Boats, I beg to state that Boats of various sizes and description ply for the purpose of taking passengers in such numbers as offer to the other side of the River, at all the Ghauts on the Calcutta side, wherever they can find convenient landing from the mouth of the Circular Canal to Whatgunge Ghaut, immediately below Hasting's Bridge, one kind of Boat chiefly employed in conveying Native passengers may be considered as Public Ferry Boats.

3rd. In reply to query 2nd, there seems to be no fixed times at which passage in such Boats can be obtained, the Boats continuing to ply at all hours of the day and at all times of the tide, but they are mostly employed early in the morning and at sunset in the evening, bringing people to market with the produce of their gardens from the other side, and somewhat later in the day, sircars, artificers and labourers to attend their business and employments in the City, and to return with them to their homes in the evening, the fares on these Ferry Boats I understand are about half a pice, or the eighth of an anna a head, or even less in proportion to the ability of the passengers to pay; very poor people are taken gratis. Bhurs or Cargo Boats, Punsways and Dinghys for Cargo and passengers ply at all hours of the day and night, and at all times of the tide as may suit the business they are employed upon at the fares noted in the margin.*

4th. With reference to the 3rd, 4th, and 5th queries I am not aware of any regulation in regard to the number of passengers admitted into the Boats, but doubtless the Manjees know how many people can be carried in them, with reference to their size which is generally from 16 to 30 individuals. The Boats employed conveying Native passengers are very inferior to the Gardwarry or Ferry Boats employed on the Ganges, and many accidents occur from their being overloaded with passengers in rough

* *Hire per day.*

Bhur 1-8 to 2 Rs. and 2-8, according to Burthen.

Punsway of	2 oars	8 to 10 As.
Do.	3 ,,	12 to 14 ,,
Do.	4 ,,	14 to 1 Rs.
Do.	6 ,,	1-4 to 1-8 As.

Dinghys 8 As.

For crossing the water.

Bhur 4, 6, and 8 As.
Punsway 1, 1½, to 2 ,,
Dinghy ½, ¾, to 1 ,,

weather, and from unskilful management getting athwart hawse of the shipping in strong tides. I have witnessed a small boat without a house or choppah conveying 30 or 40 passengers, with only a single oar to propel her, besides the steerman's scull or steering oar. Loss of property and life frequently happen on Bhurs, Punsways, and Dinghys, likewise.

NOTE.—I was acquainted with the Commander of a Country Ship, who returning to his Vessel at night in his Dinghy, was found drowned—the Dinghy people absconded and were never heard of afterwards.

5th. In reply to the 6th and 7th queries, I consider that a Registry of all Boats employed on the River is urgently required, and that the Boats should be numbered and registered with the name of the owner and Manjee, the number of oars or dandys, its burthen in maunds, with the number of passengers it is allowed to carry: the owner should give security to a certain amount before a license to ply is granted to him, for which a corresponding fee might be charged to meet the expenses of a Registry Establishment. The number of the Registry with the weight in maunds should be marked on the Quarter of the Boat, and on the Ferry Boats the number of people they are licensed to carry. It would be necessary to impose a fine on all Boats found plying without a license within a certain time after the passing of an Act of the Legislative Council for the Registry of the Boats. This Act I conceive should include all description of Boats plying off town for hire, for if the Act applied only to Ferry Boats for the conveyance of passengers, it would be easily evaded.

6th. In reference to the 8th and 9th queries the following Ghauts seem to be most generally frequented by the native Ferry Boats, viz.

From Hautkollah Ghaut to Sulkeah Ghaut; from Rajah's Ghaut to Golabaree Ghaut, from Armenian Ghaut or Meerbohur's Ghaut to Howrah Ghaut; from Colvin's Ghaut to Ramkistopore or Seebpore Ghaut; from Whatgunge Ghaut to Bhurparah Ghaut. It might be expedient therefore to confine the Ferry Boats to these Ghauts only. I am not aware that any Ghaut duty or Toll is exacted at any of the Ghauts above-mentioned, except at Whatgunge, the wharfage of which is stated to me to be farmed for 2,000 Rs. per annum, from the Collector of 24-Purgunnahs, consequently all Boats that do not belong to the Lessee or farmer must pay a Toll, the amount of which I have not been able to ascertain.

7th. With regard to preventing Obstructions at Public Ghauts, and in reply to the queries there anent, independent of the destruction of pucka Ghauts by allowing Boats to lie upon them when the tide is high, as may be witnessed at the present Bankshall Ghaut, much inconvenience and damage to public and private Boats occurs by the evil practice of blocking up the Ghauts, it seems therefore highly expedient that all pucka Ghauts extending into the river and intended to facilitate the landing of passengers should be marked off by strong posts, running out as far as low-water mark, within which line of demarcation no Dinghys or other passenger Boats should be allowed to remain but for the purpose of landing and embarking passengers: when the Boats are waiting for freight they should be stationed outside of the posts and the passage to the Ghaut left at all times clear. These objects I think might easily be provided for by a clause in the proposed Legislative enactment, upon which might be founded a few simple rules to be enforced by the attendance of peons at each Ghaut.

8th. I beg to acknowledge the receipt of your letter No. 1782, dated the 21st instant, and regret to state, that there are no other Officers in the Department from whom I can call for information on this subject but Captain Bowman. I have submitted the draft of this letter to him, and that Officer concurs generally in all my views on the several questions under consideration.

I have, &c.,

(*Signed*) A. B. CLAPPERTON,
Officiating Master Attendant.

MASTER ATTENDANT'S OFFICE:
The 24th April, 1847.

No. XX.

To THE HONORABLE SIR JOHN P. GRANT, Kt.,

Chairman, Committee upon Municipal Improvements.

Sir,

I have the honor to acknowledge the receipt of your letter No. 4000, dated the 16th instant, and in reply beg to offer the accompanying Answers and Suggestions which have from time to time presented themselves to me during an experience of three years in this port; my duties leading me constantly afloat.

First,—as to Ferry Boats.

1st. There are Ferry Boats regularly plying from all the Ghauts on this side the River except Baboo's, Chandpaul, Bankshall, Coelah, Custom House, Mint, and one or two of the minor Ghauts that may be considered as Public Ferry Boats.

2nd. These Boats cross at all hours of the day, and in the fruit season nearly all night, and extort all they can get from the passengers: the proper fare being half a pice to one pice each trip: according to the state of the weather.

3rd. Yes; but very badly arranged, the regulation number being far too many in a tide-way, and that number frequently far exceeded in the very face of the Police.

4th. Insufficient and deficient in all points.

5th. Frequently, and to a considerable amount of both.

6th. Certainly it would give individuals a clue in case of extortion or plunder.

7th. [Not answered.]

8th. In my opinion no Regulation can be made on this point, as for instance,—A person wishing to land at the Howrah Ghaut, must embark at Smith's Ghaut on a flood-tide, and at Jackson's on the ebb, in common easy tides, consequently the boatmen must accommodate themselves to the tide. I have embarked a little to the southward of the Mint Ghaut in a fast-pulling well-manned Government Beauleau, and with difficulty fetched Howrah Ghaut in the freshes.

9th. The above applies to the Howrah and Sulkea side also.

I am of opinion, that there is more roguery committed, and more lives and property lost (in proportion) in the Boats plying from the Ghauts below Howrah Ghaut on that side the river, than at the other Ghauts, owing to the fact that they are more out of reach of the Howrah Police, consequently the Boats are more overloaded, and frequently, I have no doubt, capsized for the sake of plunder.

No laws can be effectively carried out to remedy the many evils enumerated in the above Questions and Answers, without a good and efficient river Police, with a good active and responsible person as Registrar of Boats and Superintendent of that Police.

Secondly,—preventing Obstructions at Public Ghauts.

1st. There is much inconvenience and danger, amounting to the destruction of life and property, arising from the obstructions allowed at these Ghauts, and these obstructions have greatly increased at the principal Ghauts, say Chandpaul, Colvin's, Police, and Bankshall Ghauts, since a recent order prohibiting Budgerows and Beauleaus lying off the Esplanade, as well as from the public Ferry Boats and private Dingies at these and all other Ghauts. These obstructions and inconveniences may be obviated by many measures. A very simple one I suggested to the Howrah Police about nine months ago, and which they acted upon for some months with great success. A space of some twelve or fifteen feet of the Ghaut was measured off for the landing place, and there were Police Chowkedars stationed to see that all Boats, Beauleaus, &c. were hauled off and moored on either side of the Ghaut as soon as they had deposited their cargoes or passengers, thereby keeping a clear space for

landing or embarking. Further facilities against these obstructions may be obtained by increasing the number of Public Ghauts, by levelling down the banks of the River in various places, which are now filled up with bricks, anchors, and various heaps of dirt and lumber belonging to private individuals, to the obstruction of a free circulation of air, the obstruction of some of the existing Ghauts, and the detriment of the Banks of the River. I here add an idea that I have long entertained, that the whole of the dead sea* wall, extending from Police Ghaut to Colvin's Ghaut, and from Colvin's Ghaut to Chaundpaul Ghaut, might, with small expense, be laid open as a Ghaut or landing-stair, by throwing a flight of steps of masonry along, or what would be lighter, more easily contrived, more securely placed, and I should imagine more cheaply constructed, a succession of flights of iron steps or stairs placed at intervals sufficient to allow of Boats lying between them to await their employers or chance comers.

* Sic in original. —J M.

Should the above meet with the approbation of your Committee, or my poor exertions be of any service in carrying any researches tending to the improvement of the existing state of the River irregularities, I beg most humbly to tender my services, and

Have the honor to be,

Sir,

Your most obedient Servant.

EDMUND ONSLOW,

Officiating Second Assistant Master Attendant,
Superintending Duties of Harbour Master.

MASTER ATTENDANT'S OFFICE:
The 29th March, 1847.

No. XXI.

To SIR J. P. GRANT,
Chairman of the Municipal Committee.

SIR,

I have the honor to acknowledge the receipt of your letter dated the 6th current, and annexed I have the pleasure of submitting the answers to the queries therewith conveyed, in so far as it is in my power to embody them in such a form. The subject is one that from my long experience of the shipping interests, and traffic of this river, suggests much matter that might more fully and more conveniently, for your Committee and for myself, be disposed of orally than by committing it to paper. I trust however this communication, so far as it goes, will be found substantially to meet your questions, and should it be desired, I shall cheerfully wait upon the Committee, at any time they may appoint, in order to afford them such information on the subject of enquiry as I possess.

In reply to your Queries, I answer—

1st. There are no fixed Ghauts from which passage or Ferry Boats are accustomed to ply between this and Howrah, but they principally arrive and depart from Colvin's, Beeby Ross', Chandpaul, and New Mint Ghauts. These Boats are numerous, and of all sizes, the whole of them belong to the Howrah side, and are not in any way connected with the regular Dinghies seen in daily attendance at the various Ghauts; and no licences are given that I am aware of.

2nd. There are no fixed times for the arrival or departure of these Boats; they are plying the whole day through, and the Maunjee leaves the Ghaut so soon as he gains what he considers a sufficient sum to pay for his trouble, and the usual charge is one pice for every two sitters, but the force of competition often induces them to take three and sometimes four for that sum.

3rd. There are Regulations in existence at Howrah regarding the number of passengers a Boat shall carry, and several of the Boats, as also Dinghies, have, to this day, marked on

their bows, the number they are allowed to take, but the rule was never stringently enforced, and has now become a dead letter. I am aware many lives and much property are lost monthly by the upsetting of Boats from their being overloaded. A very short time past I saved upwards of a dozen people of both sexes, who had escaped from a Boat that had sunk, and one of the people I questioned told me, the Boat was marked to carry 25 people, but that he had counted 36, and the Maunjee had been heard to say, he had received fares for 42; it was supposed 8 lives were lost in this Boat.

4th. The Boats generally are good, as also well-manned, and when properly laden I consider quite safe, but very few arrive at, or leave the Ghaut in that condition; and it was only three mornings since while passing Colvin's Ghaut, I saw a boat capsize by merely grazing over a vessel's cable; now this boat had not only a full complement of passengers, but was also laden with baskets of vegetables to a great height, and so deep was this Boat, that there was not more than two inches of gunwale out of the water; fortunately the accident happened close in shore, otherwise I think it likely many lives would have been lost.

5th. I know from actual observation that not only much property but many lives are lost every month from the want of Regulations, and people to enforce them.

6th. The Regulation commenced at Howrah, of registering each Boat, and fixing the number of passengers she could carry, would, if properly carried out, be a great benefit, and if at the same time, each Boat was marked with a paint line, how deep she could be loaded, much further mischief would be prevented; the custom at present is, for these Boats to get all the cargo they can, and then take their accustomed number of passengers, throwing out a cheaper fare as an inducement. If a load-mark was given to each boat, this could not be done.

7th. The only way I can see of reforming the present system, would be by establishing a regular Code of Rules, as also fixing upon particular Ghauts from which alone they would be allowed to ply, and at those Ghauts, having an establishment purposely to enforce the regulations. I consider four Ghauts on each side of the river, would be ample for all purposes of traffic between Baboo's Ghaut and Nimtollah, and two at Cooly Bazar; it would also prevent much confusion, and I think theft, if they were only allowed to leave this side at fixed times (say every hour) between 5 A. M. and 7 P. M., after which nothing but regular Dinghies ought to be allowed to pass. I do not think it would be advisable to tie them down to any particular time of tide; only let the Boats be properly loaded, and there is no danger to be feared, more especially if the shipping were moored, so as to leave a clear space opposite each Ghaut.

8th. As above stated, I think four Ghauts would be ample for all purposes on the other side, and the fixing of them could be settled by the Police.

I may further remark that much nefarious traffic is carried on through these Ferry Boats being allowed to pass free from enquiry at all hours, and I know from experience large quantities of opium, bang, salt and other articles, are smuggled into Calcutta through these Channels. My attention was first drawn to this, while residing at Rangoon, I there found large quantities of opium and bang imported annually, which had never been subject to duty from this port, and on enquiry from Natives well informed in these matters, I found, that there was scarcely a Ferry Boat that came over to Calcutta from Rajgunge, even as high up as Serampore, that had not on board something requiring concealment; and on further enquiry I was perfectly satisfied that not only opium, but many other articles were smuggled in large quantities by the aid of baskets, apparently filled with vegetables.

The Obstructions at Public Ghauts.

The amount of inconvenience occasioned by the indiscriminate use of the Ghauts of Calcutta is beyond conception, and in no part of the world have the dishonest so great facili-

ties for carrying on their nefarious practices afloat, nor do I think there is any port on this side the Cape, where river thefts are carried on to so great an extent, or with such facility, all of which I consider is caused by allowing produce to be landed and shipped at any Ghaut, most convenient to the parties concerned, and that at all hours, Sundays, Holidays, or work days, without the interference of a soul, to say, aye, or nay ; and in my daily routine of duty on the river, I see bags being put on board vessels, as full and in good order that long experience tells me is far from giving [being] the case, and cases, and bales of valuable merchandise, all bearing evident marks of hasty and clumsy packing, which would not be allowed to pass from any office, and which had evidently been opened since leaving the Ghauts. I am also aware that many and serious thefts are committed between the Custom House and the vessels, by allowing the Boats to leave the Ghauts at an hour too late to permit of their getting to the vessel that night, and the Cargo thereby temptingly exposed to theft.

Under existing circumstances I do not see clearly how these malpractices could be entirely stayed, but a Code of Laws could be easily framed for the purpose, which if honestly carried out, would effectually correct these manifold evils, and in the meantime I am convinced, much could be done, by having rules laid down for the regulation of Bhurs, Dinghies, passage Boats, and Beauliahs, fixing the Ghauts at which alone they will be allowed to lie, and the hours at which they will be allowed to traverse, having passes if requisite for extra hours.

The inconvenience to passengers by the indiscriminate use of the Ghauts is actually very great, but I do not think there is much danger or loss of life caused by it, and I consider all would be avoided if each class of Boats had Ghauts allotted to them for their particular use

I have the honor to be

Sir,

Your most obedient Servant,

W BOOTHBY.

No date
Received 16th April, 1847

No. XXII.

To SIR J. P. GRANT,

Chairman of the Committee on Municipal Improvements

SIR,

In reply to your letter No. 4022, of the 16th instant, I have to submit the following replies to the questions put for my consideration, and to offer the annexed few remarks.

Answers to Questions.

1st. As long as I can recollect, Chaundpaul, Colvin's, Police, Coila, Smithson's, Armenian, Bebee Ross', Burrah Bazar, and the New Mint Ghauts, have been used as Public Ferries, and latterly Baboo's Ghaut, but whether these are or may be termed fixed Ghauts, I cannot say

2nd. Ferry Boats ply at all hours of the day from the above-mentioned Ghauts, without reference to the tide, but I know not whether there are any fixed or customary fares.

3rd. Some few years back Regulations were made for the number of persons to be conveyed on each Boat, agreeably to their size, and the same was painted outside the Boat.

4th. I am not acquainted with the fitness of the Ferry Boats in general, but know them to be of all sorts—good, bad, and indifferent.

5th. I am perfectly aware that accidents frequently occur from the Boats being overloaded, by which great loss of life and property is sustained.

6th. I consider it absolutely requisite that all Cargo Boats, Ferry Boats, Dinghies, and every description of public Boats, should be licensed, registered, and numbered in a very conspicuous manner on each side, both in English and the Native character, as also the number of persons they are allowed to carry, and the Ghaut they ply from.

7th. I believe that nothing less than the employment of a respectable European Superintendent, and Peons under him on the banks of the river, would have the desired effect, and this person should have an office and residence on the Strand, where parties could make their complaints if necessary, either by day or night.

8th. The number of Ghauts are sufficient at present, but I am of opinion, that those that may be fixed upon for regular Ferry Ghauts, should be as clear as possible of the shipping at the moorings, to prevent accidents, which frequently occur among the buoys—the time of the departure of the Boats may be regulated by the Superintendent, as they now ply at all times of the tide.

9th. The number of Ferry Ghauts at present in use on the other side the water, I believe to be sufficient, they are Goolabarree, or what is now termed Sulkea Ghaut, Howrah, Goladangah, and that at Seebpore, the time for crossing as above.

REMARKS.

Obstructions at the Ghauts, and also upon the River.

The greatest obstruction in my opinion proceeds from cargo and large up-country Boats. These when *not employed*, are moored in great numbers between the shore and the inner mooring buoys, from the Custom House to the Armenian Ghaut, so as to completely block up the passage, and cause all Boats on their way up and down the river to proceed outside the shipping and buoys, which sometimes is totally impossible from the strength of the tide, and exceedingly dangerous to attempt. The Cargo Boats when not engaged should be moored two abreast in a line above the Armenian Ghaut, at a sufficient distance from the shore to allow of a passage inside them. The up-country Boats should land their cargoes above the Shipping Ghauts. They are large unwieldy boats, and not easily managed among ships and buoys in a strong tide-way.

Another great obstruction is caused by Boats of all descriptions lying at the Ghauts for hours together, blocking up the passage entirely, and preventing persons from landing without going over them. The whole of the banks of the river on the Calcutta side, from Chaundpaul Ghaut to the New Mint, should be appropriated to the landing of goods, loading of Boats, and the embarking of passengers, the great inconvenience now experienced arising from the greater portion of the River frontage being occupied by private individuals.

For the last eight or ten years I have been in the daily habit of landing and embarking from either the Armenian or Bebee Ross' Ghauts, which I may say nearly join each other, and have very frequently been obstructed by the wrecks of Boats, spars, old guns, iron kentledge, broken anchors, etc., thrown out of Boats at any time of tide, and allowed to remain for days and weeks together, according to circumstances.

Boats coming to the Ghaut at night are often belged by these obstructions; indeed a look at Bebee Ross' Ghaut at the present time would satisfy any one how needful regulations are required on the banks of the river.

I could add much more, but what I have already stated may be deemed sufficient for the present. I beg however most strongly to recommend, that some of the Gentlemen forming the Committee, should take a stroll along the banks of the river, from Chaundpaul to the New Mint Ghauts, and form their own opinion as to what can, and ought to be done, for it strikes me very forcibly, as I have before stated, that to carry out the desired improvements, the whole river frontage will be required.

I have the honor to be,
Sir,
Your most obedient Servant,
EDWD. OAKES,
Surveyor of Shipping.

CALCUTTA:
23rd April, 1847.

No. XXIII.

To THE HONORABLE SIR JOHN PETER GRANT, KNIGHT, M. A.,
Chairman to the Committee upon Municipal Improvements, Calcutta.

HONORABLE SIR,

I have the honor to acknowledge the receipt of your Letter of the 17th ultimo, proposing certain questions with the view of eliciting information touching the necessity for framing laws for the Regulation of Ferry Boats, plying between Calcutta and the opposite bank of the River, and preventing the Obstructions of the Public Ghauts of Calcutta by Boats remaining a long time in front of them.

2nd. On perusing your Letter I was at a loss to conceive why the Chief Magistrate should have led you to suppose that the information you seek might be obtained from those connected with my office. On my referring to that functionary, I was permitted to peruse his Letter to your address, dated 26th June 1845, and from the concluding portion of the 3rd, Para. of that communication, I learned that Mr. Patton referred to the Master Attendant's and Harbour Master's Departments, the Inspector of Customs and the better class of Preventive Officers, as best calculated to offer useful suggestions on the subject of your enquiry.

3rd. I regret my inability from personal experience or observation to afford you the assistance I should have been too happy to render, I have however collected data from different sources, and proceed to lay before you the information thus derived in juxta-position with the question proposed in your communication, which to the best of my belief, will be found to be substantially correct.

In reference to Ferry Boats—

1st. There appears to be no fixed Ghauts for the purpose, but those at which the greatest traffic obtains, are Hautkoolah, Mint, Beebee Ross' and Colvin's Ghauts, and might be reckoned as Public Ferries.

2nd. These passage Boats can be obtained at all times and all hours, and start as soon as they have a sufficient number of passengers. In such cases the fare is half a pice for each person, but if it is otherwise, there is no fixed fare, the boatmen and passengers make their own terms.

3rd. There are no Regulations for this side of the River in this respect.

4th. The Boats generally used are by no means good and sufficient, and are invariably ill-appointed both in tackle and hands.

5th. The frequency of accidents to these Boats may doubtless be attributed to the want of proper Regulations, which are very much required.

6th. This would unquestionably prove of great advantage and be well calculated to prevent passage Boats from being over-crowded.

7th. This question embraces many important considerations, and as I have had but little experience in the matters it involves, I do not consider myself competent to offer an opinion upon it.

8th. The four Ghauts named in reply to the 1st query, and Boats might with safety be suffered to start at all times, excepting when the *bore* is expected to set in, and on these occasions they ought not to be permitted to quit within an hour of its appearance.

9th. The four Ghauts now used, will I believe answer every reasonable purpose. They are named, Sulkeah, Golabarree, Howrah and Ramkistopore Ghauts.

Secondly the preventing obstructions at Public Ghauts—

1st. Considerable inconvenience must necessarily be occasioned by Boats crowding promiscuously at the public Ghauts, and accidents sometimes occur by their coming in collision with each other, particularly when the *bore* sets in. I do not feel myself competent to state what Regulation might be made to prevent these obstructions. Restriction as to time will doubtless operate prejudicially and prove a fruitful source of unlawful exaction on the part of the underlings to whom the duty of regulating such matters may be entrusted. The evil, however might be, in some measure, mitigated by preventing all Boats except those about to take in or discharge cargoes or passengers from being moored at the Ghauts.

I have the honor to be,
Sir,
Your most obedient Servant,
GEORGE W. S. HICKS,
Superintendent of Police.

POLICE OFFICE, CALCUTTA;
9th June, 1847.

No. XXIV.

No. 4045.

To MAJOR F. W. BIRCH,
Magistrate.

SIR,

Two Questions which were suggested by the late Mr. McFarlan, Chief Magistrate of Calcutta, as deserving the consideration of Government, whereby the Government referred to the Municipal Committee, of which I have the honour to be Chairman, to report upon, viz.

First, The passing of a Law and for the Regulation of Ferry Boats plying between Calcutta and the opposite bank of the River.

Secondly. The passing of a Law to prevent the Obstruction of Publick Ghauts within the limits of Calcutta, by Boats remaining a long time in front of them.

Connected with these, it appears to the Committee that there are other matters regarding the River Police, which it is their duty to report upon.

The Committee are assured, from the length of time you were Superintendent of the Police of Calcutta, and your well-known zeal and activity in the discharge of the important duties of that Office, that you can give them material information upon the following subjects :

First, In reference to Ferry Boats—

1. Whether there was in your time, or is now, any customary or other Regulation in regard to the number of persons admitted into the Boats with reference to their size ?

2. Whether the Boats which then plied, or now ply for the above purpose, were or are good and sufficient and well-appointed in tackle and hands ?

3. Whether from the want of Regulations on the above subjects, accidents frequently occurred or now occur attended with loss of life and property ?

4. Whether it would be expedient, that Boats allowed to ply as Publick Ferry Boats should be numbered and registered with the name of the owner, and that the name of the owner together with the number of passengers it is permitted to carry, should be painted in legible characters in some conspicuous part of the Boat ?

5. What other Regulations it would be expedient to enforce by Law upon the above matters ?

6. What number of Ghauts and at what stations, ought to be fixed for the departure of such Ferry Boats on the Calcutta side, and at what times of the Tide ?

7. What number of Ghauts, and at what stations ought to be fixed, on the other side for the return of such Ferry Boats from thence to Calcutta, and at what times of the Tide ?

To your answers to the above Queries, be pleased to add such further information or suggestions as appear to you useful.

Secondly, The preventing Obstructions at Publick Ghauts—

1. Whether there was in your time, and is now, any and what amount of inconvenience or danger occasioned by the obstruction of these Ghauts from Boats remaining a long time in front of them, and whether any and what Regulations ought to be and might be made to prevent such obstructions, without interfering with the time necessary for landing passengers and cargo or for taking them on Board ?

Be pleased to add to your answer such information or suggestions, as may appear to you useful on this head.

Thirdly, In reference to other matters regarding the River Police.

The Committee are in possession of a copy of your valuable Report in 1836 to Government on the River Police. They will be obliged by your stating whether you see reason to correct any thing in that Report, or can add any thing to it respecting the system and extent of pilfering or plundering that prevails on the River, in the shipping and landing cargo and passengers, or the transit of Goods and passengers by the River from one place to another; and whether these depredations were or are frequently, or eve. attended with murder or personal violence, and what Laws or Regulations ought in your opinion to be passed for the prevention of these crimes, and the means by which they could be prevented ?

The Committee will also thank you, if you can afford them, any information respecting the number of persons residing on the opposite bank of the Hooghly, that find daily employment in Calcutta, and the probable average number of persons daily passing from one side to the other.

I have the honour to be,
Sir,
Your most obedient Servant,
(Signed) J. P. GRANT,
Chairman of the Committee upon the Fever Hospital and Municipal Improvements.

MUNICIPAL OFFICE, TOWN HALL:
The 18*th June*, 1847.

No. XXV.

No. 4046.

To RUSTOMJEE COWASJEE, ESQ.,
&c. &c. &c.

SIR,

Two Questions which were suggested by the late Mr. McFarlan, Chief Magistrate of Calcutta, as deserving the consideration of Government, were by the Government referred to the Municipal Committee, of which you are a Member, and I have the honour to be Chairman, to report upon; viz.—

First. The passing of a Law for the Regulation of Ferry Boats plying between Calcutta and the opposite bank of the River.

Secondly. The passing of a Law to prevent the Obstruction of Publick Ghauts within the limits of Calcutta by Boats remaining a long time in front of them.

Connected with these it appears to the Committee, that there are other matters regarding the River Police which it is their duty to report upon.

In reference to all these, the Committee will be much obliged to you, if you can afford them any information in answer to the following Queries.

First. In reference to Ferry Boats—

1. Whether there are any or what fixed Ghauts, on this side of the River, from which Boats ply for the purpose of taking passengers in such numbers as may offer to the other side, and may thus be considered as Publick Ferry Boats?

2. Whether there are any fixed times, at which passage in such Boats can be obtained, and fixed customary fares?

3. Whether there is any customary or other Regulation in regard to the number of persons admitted into the Boats with reference to their size?

4. Whether the Boats which now ply for the above purpose are good and sufficient, and well-appointed in tackle and hands?

5. Whether from the want of Regulations on the above subjects, accidents frequently occur attended with loss of life and property?

6. Whether it would be expedient, that Boats allowed to ply as Publick Ferry Boats, should be numbered and registered with the name of the owner, and that the name of the owner together with the number of passengers it is permitted to carry, should be painted in legible characters on some conspicuous part of the Boat?

7. What other Regulatious it would be expedient to enforce by Law upon the above matters?

8. What number of Ghauts, and at what stations ought to be fixed, for the departure of such Ferry Boats on the Calcutta side, and at what times of the Tide?

9. What number of Ghauts, and at what stations ought to be fixed, on the other side for the return of such Ferry Boats from thence to Calcutta, and at what times of the Tide?

To your answers to the above Queries, be pleased to add such further information or suggestions as appear to you useful.

Secondly. The preventing Obstructions at Publick Ghauts—

1. Whether there is any and what amount of inconvenience or danger occasioned by the obstruction of these Ghauts, from Boats remaining a long time in front of them, and whether any and what Regulations might be made to prevent such obstruction, without interfering with the time necessary for landing passengers and cargo, or for taking them on board.

Be pleased to add to your answers, such information or suggestions as may appear to you useful on this head.

Thirdly. In reference to other matters regarding the River Police.

1. Does there to your knowledge prevail, and to what extent, a system of pilfering and plundering upon the River, in the shipping and landing cargo and passengers, and to what causes do you attribute it?

2. Does such system and to what extent prevail, in the transit of goods and passengers by the River, from one place to another?

3. Are such depredations frequently or ever attended with murder or personal violence?

4. What Laws and Regulations would it be fitting in your opinion to pass for the prevention of these crimes?

5. Would it be expedient to enact that all Boats plying for hire upon the Hoogly, shall be numbered and registered, and the name of the owner registered also, and the name of the owner together with the registered number painted in legible characters on some conspicuous part of the Boat?

I have the honour to be,
Sir,
Your obedient Servant,
(Signed) J. P. GRANT,
Chairman of the Committee upon the Fever Hospital and Municipal Improvements

MUNICIPAL OFFICE, TOWN HALL:
The 18th June, 1847.

No. XXVI.

No. 4047.

To E. JENKINS, ESQ.,
Magistrate of Howrah.

SIR,

Two questions which were suggested by the late Mr. McFarlan, Chief Magistrate of Calcutta, as deserving the consideration of Government, were by the Government, referred to the Municipal Committee, of which I have the honor to be Chairman, to Report upon; viz.—

First. The passing of a Law for the Regulation of Ferry Boats plying between Calcutta and the opposite bank of the River.

Secondly. The passing of a Law to prevent the Obstruction of Publick Ghauts within the limits of Calcutta, by Boats remaining a long time in front of them.

The Committee will be much obliged to you if you can afford them any information upon the subject, noticed below.

First. In reference to Ferry Boats.

1. Whether there are any, or what fixed Ghauts on the Howrah side of the River from which Boats ply for the purpose of taking passengers, in such numbers as may offer, to the other side, and may thus be considered as Publick Ferry Boats?

2. Whether there are any fixed times at which passage in such Boats can be obtained, and fixed customary fares?

3. Whether there is any customary or other Regulation in regard to the number of persons admitted into the Boats with reference to their size?

4. Whether the Boats which now ply for the above purpose, are good and sufficient and well-appointed in tackle and hands?

5. Whether from the want of proper Regulations on the above subjects, accidents frequently occur attended with loss of life and property and to what amount?

6. Whether it would be expedient that Boats allowed to ply as Publick Ferry Boats, should be numbered and registered and the name of the owner registered likewise, and that the number of the Boat, name of the owner, together with the number of passengers it is permitted to carry, should be painted in legible characters in some conspicuous part of the Boat?

7. What other Regulations it would be expedient to enforce by Law upon the above matters?

8. What number of Ghauts, and at what stations, ought to be fixed for the departure of such Ferry Boats on the Calcutta side, and at what times of the Tide?

9. What number of Ghauts, and at what stations, ought to be fixed on the Howrah side, for the return of such Ferry Boats from thence to Calcutta, and at what times of the Tide?

10. Whether robbery or murder ever occur?

11. Whether pilfering or plundering goods in transit to and from the shipping or to the opposite shore is frequent? and to what probable extent?

12. Whether there are any known or generally suspected receivers of such stolen property resident on the Howrah side?

To your answers to the above Queries, be pleased to add such further information or suggestions as appear to you useful.

Secondly. The preventing Obstructions at Publick Ghauts.

1. Whether there is any and what amount of inconvenience or danger occasioned by the obstruction of these Ghauts on the Howrah side from Boats remaining a long time in front of them, and whether any, and what Regulations ought to be made, to prevent such obstructions without interfering with the time necessary for landing passengers and Cargo or for taking them on board.

Be pleased to add to your answer such information or suggestions, as may appear to you useful on this head.

The Committee will be obliged by your favouring them, with copies of any existing Rules or Regulations, for preventing the over-loading of Ferry Boats, and the obstructing of the Publick Ghauts, and stating whether these are general Regulations, issued by Govern-

ment or Regulations of the Howrah Police, and whether they are now observed and enforced, or have fallen into disuse. They will also be obliged to you to state if in your power, the probable number of persons residing on the Howrah side of the River, that find daily employment in Calcutta, and the probable average number of persons who pass daily between Howrah and Calcutta. This information they are induced to believe, you may obtain from the Ghaut Mangees and the Police Thannahs.

I have the honour to be.

Sir,

Your most obedient Servant,

***(Signed)* J. P. GRANT,**

Chairman of the Committee upon the Fever Hospital and Municipal Improvements

MUNICIPAL OFFICE, TOWN HALL:

***The* 18*th June*, 1847.**

No. XXVII.

No 4048.

To CAPTAIN G. W. S. HICKS,

Superintendent of Police, Calcutta.

SIR,

I have had the honour to receive your letter of the 9th instant, in answer to mine of the 17th ultimo, putting certain questions with a view to obtaining information regarding the necessity for framing Laws for the Regulation of Ferry Boats, and preventing Obstructions to the Publick Ghauts, and I have to return you in the name of the Municipal Committee, for whom I solicited the information, and my own, our best thanks for the very valuable information you have communicated in answer to the questions put, which answers will form part of our Report to the Government, now printing in obedience to the reference made to us upon these important subjects.

I observe that you say, that on perusing my letter you were at a loss to conceive why the Chief Magistrate should have led me to suppose, that the information I sought might be obtained from those connected with your Office, and that you had ascertained that Mr. Patton had referred to the Master Attendant's and Harbour Master's Departments, the Inspector of Customs, and the better class of Preventive Officers. I think it right therefore to explain, that the reference in the letter addressed to you to the suggestion of the Chief Magistrate arose from a mistake of the Clerks, and an inadvertence of mine in the direction I gave for preparing a letter to your address. A Letter was prepared and corrected by me, addressed to the Master Attendant and other gentlemen, suggested by the Chief Magistrate, and when I desired Letters to be made out for you, and one or two others not suggested by him, I inadvertently directed the same letter to be sent without desiring the reference to the Chief Magistrate to be omitted. The copies were made without alteration, and I signed them without observing this.

The trouble I have given you, being attributed to the Chief Magistrate's suggestion, arises from this mistake : you truly owe it to my knowledge that the duties of the Superintendent of the Police of Calcutta extend over the River so far as it forms the Harbour, as well as over the City of Calcutta, unless the duties have been altered since the time of your predecessor, which I have not heard of. That gentleman, Major then Captain Birch, did accordingly furnish our Committee at an early stage of our proceedings, with a very valuable paper on the subject of the River Police, which forms part of Appendix to Appendix (C) to our First Report, at page 56.

In my opinion, that you were a most fit person to be applied to for the information we required, I am glad to find the valuable information you have given us proves that I was not mistaken, and I am very sure that you will think the trouble it has given you not misapplied.

At the time of our First Report it was a general opinion among those acquainted with the working of the Police, that the duties of the River Police being added to those of the Town Police, rendered the Office of Superintendent more complicated and laborious than one Officer could efficiently discharge, with reference not merely to the superintendence of the Ferry Boats and the Ghauts, when these should be put under a good system, but to the thefts, pillage and gang robbery, all of which till lately subsisted, and the two former of which still subsist to a great amount.

It was then suggested that the superintendence of the River Police should be committed to a separate Officer, whose jurisdiction should extend over both banks of the River within certain limits, and with reference to offences committed upon the River, or regarding its navigation, and having his office on the Strand Road, or elsewhere near the River's bank.

We should be glad to know your opinion upon this suggestion, and any other suggestion of your own upon this subject.

In order to make the Government perfectly aware of the practical importance of strict regulations regarding the Ferry Boats and Ghauts, we should be glad to obtain an approximate estimate of the number of persons who cross the River daily, the number of persons who reside on the Howrah side and earn their living in Calcutta, and the number of Boats of all descriptions, which ply daily from each of the several Ghauts on the Calcutta bank.

We suppose this information might be obtained from the Ghaut Manjees, and might be sufficiently ample for the purpose, without going into a minute detail, and by taking only the principal Ghauts and those most in use. We do not know whether you can assist us in obtaining this information, but if you can, our Clerk, Mr. Morris, would attend you and take down from the Manjees their answers to the questions we would suggest, giving you no further trouble than procuring the attendance of the Manjees at your Office, or the Office of our Committee at the Town Hall. Mr. Morris will furnish you with Major Birch's Report, and other papers above referred to in Appendix to Appendix (C) to our First Report, on your applying for them.

I have the honour to be,
Sir,
Your most obedient Servant,
(Signed) J. P. GRANT,
Chairman of the Committee.

MUNICIPAL OFFICE, TOWN HALL:
The 19th June, 1847.

No. XXVIII.

THE HONOURABLE SIR JOHN PETER GRANT, KT.,
Chairman of the Committee upon the Fever Hospital and Municipal Improvements.

HONOURABLE SIR,

I have the honour to acknowledge the receipt of your Letter under date 18th ultimo, requesting information upon the several points detailed in your Letter, to which I beg to reply as follows.

A. 1. There never was any Regulation whatever regarding the number of persons admitted into the Ferry Boats.

A. 2. The Boats are, in my opinion, very well suited for the purpose, and quite sufficiently manned for the ordinary passage across, *that is*, carrying only their proper complement

of passengers, but not when crowded with passengers, and at the season of the freshes and bores. They are then very unsafe. They have never more than three hands, oftener only *two*.

A. 3. Accidents used frequently to occur with loss of life, I believe, to a considerable amount during the freshes and during the high winds in February and March, but particulars of the actual loss of life could seldom or ever be obtained. If the Boatmen escaped with their lives they absconded for a time. I do not think any great amount of property was involved.

A. 4. I have all along urged the expediency of registering and numbering *all* Boats, that ply upon the River, whether Ferry or Cargo Boats, and I think the name of the Manjee (not owner, as these Boats are all hired out to the Manjees and crews) together with its number and legal complement of passengers should be painted on some conspicuous part.

A. 5. I think, if such could be done, that some penalty should be enforced on the crews of such Boats as refuse or neglect to render assistance to others, in a state of peril. In England such a Law would never be needed, Europeans are mostly prompt to render assistance to others in peril, but here the utter apathy shown, must be witnessed to be fully understood : the *only* inducement to one crew to approach another in a state of peril, would be the opportunity of robbing the sinking Boat of its spars and gear, utterly heedless of the cries of their fellow-creatures when a very little exertion might save.

A. 6. Hathkollah is the chief Ghaut, the greatest traffic being through Sulkeah on the opposite side, to which Hathkollah is conveniently situated, both for going and coming, but all the Ghauts are used, with reference to the state of the tide and the point to which the passenger wishes to be transported, and I think it would be inexpedient to interfere with these, either as to time or station.

A. 7. My reply to question 6th will apply to this also, the Ghauts on the opposite side are, as well as I recollect, Sibpore, Howrah, Sulkeah and Goosrie.

Complaints have all along been numerous, and the inconvenience is very great from the crowding of Boats with Cargo and passage Boats (in which I of course include Bauleahs and Pansways). At some of the Ghauts a board is fixed, notifying that Boats will not be allowed to fix at that Ghaut, but without avail. I have been myself detained (though known to be in authority,) for some time before I could effect a landing at several of the Ghauts, the Boats being so closely jammed together, that it has been quite impossible to get between them, and I have been obliged to pass from one Boat to another, to reach the landing, leaving my own Boat outside. There can be no doubt that some Regulations *should* exist to prevent this inconvenience, but the first necessary step is to *number* the Boats, then, that Boats crowding into and closing up a Ghaut be subject to penalties, that a space be defined, say twenty feet broad in front of each Ghaut, to be kept always perfectly clear, and Ghaut keepers appointed to see that the Regulation is attended to, and delinquents brought up for punishment. There should be certain Ghauts allotted for passage Boats, where Cargo Boats should not be allowed to put to, and certain Ghauts allotted to Cargo Boats, where the publick might be allowed to land, putting up with the inconvenience of detention at such Ghauts. To Cargo Boats I would allot Bhaloo Ghaut, opposite Cooly Bazar, and North of Coilah Ghaut to Smithson's Ghaut, and North of Meerbhur Ghaut to Neemtollah, and North of Hathkollah to the mouth of the Canal ; the remaining Ghauts I would allot to passage Boats, Bauleahs and Budgerows and such craft. Of the passage Boats one Boat should be allowed only to put to the Ghaut at one time and immediately that the freight is landed, should be made to back out and

take station outside, another Boat taking her place, and so on, and the same with regard to Boats leaving with freight: thus not more than *two* Boats would at any one time be put to at any Ghaut, and no obstruction would exist.

Complaints are frequently made, and the cause much oftener occurs without any complaint being made, of the behaviour of the Boatmen in *forcing* passengers on board their Boats. Of course it is only in the case of women, or the weaker of their own sex that this occurs, for, notoriously, the Boatmen are as cowardly as they are insolent and extortionate. I verily believe that many a poor fellow who has been reported to have accidently fallen overboard from a dinghy on his passage to his ship, has been forced while in a state of helpless intoxication on board, and then robbed and murdered by being thrown overboard, and so drowned. Effective *ghat supervision*, with the numbering of all boats would, I think, put a stop to this forcing system, and save many a valuable life.

With regard to my Report on the River Police made to Government in 1836, which your Committee are pleased to make favourable mention of, not having any copy of that Report, I am unable at present, to state whether subsequent experience would have caused any modification of or addition to that Report, but as well as I can, at this distance of time, recollect the substance of that Report, I do not think that I would make any material alteration in it. I may refer your Committee to my examination on this subject before the Municipal Committee, of which the Right Honourable Sir Edward Ryan was President, which you will find in the printed Report of the proceedings of that Committee. I have unfortunately no copies of any of the Reports I have at different times made, through Mr. McFarlan, late Chief Magistrate to Government, on the subject of Police, both River and land. The plundering of cargo in transit has all along been very great, but I have considered that the merchant alone is to be blamed; where valuable property is entrusted to the care of a Churrundar, commonly an Up-country Chapprassee or discharged Sepahie, on a salary of four rupees a month, is it a matter of astonishment that he becomes the tool of the wily Bengallee boatman and Dullall, and allows the goods he has charge of to be plundered! Covered Cargo Boats have of late years been introduced by some enterprising individuals, and these, I have no doubt, have been found the most effective check to plundering.

In reply to your last question respecting the number of persons residing on the opposite Bank of the Hooghly that find daily employment in Calcutta, and the probable average number of persons daily passing from one side to the other—to the first part of the question I am unable to reply, to the latter I believe that from twelve to sixteen thousand persons pass and repass from side to side during the 24 hours. During the year 1837 I took a census of the population of the City of Calcutta, included within the Mahratta Ditch, and also a computation of the number of individuals entering and leaving the boundaries, within the 24 hours. The average daily number of the latter, including those entering and leaving by the Western or River side, amounted to one lac and seventy-five thousand and odd, and as well as I can recollect, those entering and leaving by the River amounted to either twelve or sixteen thousand; but I regret that no copy of these Reports is now to be found in the Chief Magistrate's Office, the originals having been sent in, and no Copies kept, so that I am unable to speak positively as to which amount.

Begging to apologize for the delay which has occurred in replying to your Committee's letter, which has been altogether caused by the vain search after the different documents which I was anxious to consult.

I have the honour to remain,
Honourable Sir,
Your most obedient Servant,
F. W. BIRCH,
Senior Magistrate of Police.

CALCUTTA:
15th July, 1847.

No. XXIX.

Answer of Rustomjee Cowasjee Esq., to the Chairman's Letter of the 18th June 1847, marked No. XXV. in this Appendix.

In reference to Ferry Boats.

1st. There are no particular fixed Ghauts; they ply according to the state of tide from Baboo's Ghaut to Baug Bazar, though the most frequent resorts are from Jackson's Ghaut upwards, particularly during the day, when a larger portion of passengers can generally be procured in that vicinity, than at the Ghauts lower down. Boats carrying dealers in fruit and vegetables for daily consumption, to and fro, generally ply at Colvin's Ghaut.

2nd. No fixed time. Labourers of various classes come from Howrah and its vicinity from 7 to 9 in the morning, and return from 4 to 6 in the evening, during which interval the Boats are very generally most fearfully and dangerously crowded—the fares vary from $\frac{1}{4}$ to $\frac{1}{8}$ of an anna—and this in the same Boat—the men being governed more by the number of applicants, than any fixed rule. A single individual crossing in a Boat by himself pays from one to four annas.

3rd. No interference is ever offered to their cramming the Boats to a sinking state.

4th. Very slightly built, and very inefficient men, while the crowded state of the Boat often renders it difficult to avoid danger, and utterly impossible to extricate her when once in a dangerous position.

5th. Yes; I imagine to a considerable extent.

6th. Yes; and provided heavy fines were stringently enforced for any infringement of the regulations, it would no doubt be a saving of many lives.

7th. That the Boats should be classed, and a fixed rate of hire for each class established: that both Boats and men should be examined as to their efficiency every month; that any deviation from the regulations should preclude the owner of the Boat from being admitted to the privilege of having Boats registered, &c. &c.—but whatever regulations are enforced, it is absolutely necessary that the Magistrates should be empowered to decide on all cases in a summary way, since the complainants will generally be of a class ill able to spare time for a protracted suit.

8th. This it is difficult to decide on, since much must depend upon the state of the tide: it would probably be expedient to have a Ghaut below Baboo's Ghaut, and one very high up: this would enable the Boats to avail themselves of flood or ebb for crossing, and to a certain extent avoid the more crowded parts of the River. There might also be a Ghaut in a more centrical position, which would be advantageous for crossing when the flurry and strength of the tide had abated. Time, I imagine, cannot be interfered with.

9th. From want of knowledge of the locality of Seebpore, Howrah, and Gussory, I am unable to reply to this.

Obstruction to Ghauts.

1st. No doubt a deal of inconvenience is caused both by this and the number of people of both sexes who flock to the Ghauts at all hours to bathe indiscriminately. To effect a reformation here, extensive alterations are requisite both as regards access to the Ghauts or rather places where Boats embark and debark passengers, since to reach a Boat at the most of them, the party is not only jostled, but must either wade through mud and filth, or run the risk of breaking a bone by slipping over a polished stone. As suggested in a former reply, certain Ghauts might be expressly appropriated to Ferry Boats.

River Police.

1st. and 2nd. There can be no doubt that an extensive system of plundering exists, both as to merchandize in shipping and landing Cargo, and as to goods in transit from one place to another.

3rd. I am unaware of this, but believe suspicions of personal violence to seamen and others of a night has recently been brought to the notice of the Fiscal authorities.

4th. and 5th. The system of Licensing and Registering all Boats plying upon the River, either as passage Boats or Cargo Boats, would act as a check—and a more efficient River Police would go far to reduce crime—while the infliction of severe punishment on parties actually detected, at the same time making the owner of the Boat liable for all losses occasioned by the act or neglect of his men, and subjecting him to a heavy penalty in case of connivance or participation, would, I think, effect much. All cases must however be disposed of by the Magistrate, as the tedious delay of prosecuting deters many, and the culprit is consequently encouraged to further crime.

RUSTOMJEE COWASJEE.

No. XXX.

No. 329.

FROM THE MAGISTRATE OF HOWRAH

To SIR J. P. GRANT,

Chairman of the Calcutta Municipal Committee.

SIR,

With reference to your Letter No. 4047, dated 28th ultimo, I have the honour now to furnish you with such information on the subjects therein alluded to, as I have from various sources been able to collect.

2nd. For the sake of more convenient reference, I will reply in detail to the various queries contained in your Letter.

First—In reference to Ferry Boats.

1st, The following are the Public Ghauts on the Howrah side, from which Boats ply with passengers and goods to and from the opposite Ghauts on the Calcutta side, viz.

Bandah Ghaut, Golabarry Ghaut, Howrah Ghaut, Ramkistopore Ghaut.

There is one other, Sibpore, opposite Fort William, but the number of persons crossing to and from this Ghaut is small in comparison with the others.

2nd, There are no fixed times for the Boats to start from the Ghauts, each Boat generally leaving as soon as it has its full complement of passengers, unless otherwise specially hired. The generality of passengers, composed of labourers, workmen and villagers taking their goods to the market, pay three pie or one Company's copper pice for crossing. However, in many instances, the Boatmen agree to receive fruit, goods, &c. in lieu of payment for crossing. The higher class of Natives as also Europeans are required to pay from one to two annas for the passage, but there is not any fixed rate; one anna being the customary fare

3rd, There are no Regulations specifying the number of persons allowed to be admitted into the Ferry Boats with reference to their size; but for the last three months, I have issued the following Rule, on account of the frequent complaints made to me by passengers, that the Boats they crossed in, have been so loaded as to render them dangerous, particularly at those seasons when the bores are of frequent occurrence in the River. Boats of 100 maunds measure to carry 28 persons, including three Boatmen and one Manjee. Boats of less dimensions and size to be regulated by the same scale, which is calculating each individual at three maunds weight, and deducting for Tackle, Boat's Oars, Masts, &c. 15 maunds from the sum total measurement of the Boat; thus—

Boats of Measurement 100 *Maunds*.

Permitted to carry 28 persons, @ three maunds each, . ..	84
Boats Tackle, ...	15
	99

4th, I cannot say much in favour of the Boats used for the several Ghauts, they being in general but badly built, without any regard as to their being sea-worthy. The Boats in but few instances belong to the Manjees that ply them, but are hired from Native Boat Builders in Calcutta, who of course take little care in the construction of them. Their object being only to build as many as they can possibly get hire for. Boats above 50 maunds are required to have three Boatmen and one Manjee. This Rule however I find little attended to, unless my Police exercise great vigilance at the Ghauts as the Boats are starting.

5th, I have no data in my office to which I can refer, respecting the loss of life and property, the jurisdiction of the River being under the Chief Magistrate of Calcutta. There are, I am aware, many accidents occurring particularly during the rainy seasons, as the River gradually swells and increases in breadth, but these are never officially reported to me.

6th, As to the expediency of Boats being Registered, both as to the name of the owner, the number of the Boat, together with the number of Passengers it is permitted to carry, I have no question, having already adopted this custom in as far as it is in my power. It is the only means I find, by which any control can be maintained over the Boatmen, who at all times are willing to carry as many passengers and goods as they can get on board their Boats without any regard to the safety of the Boats or the convenience of the passengers.

7th, It would in my opinion be desirable to have all Ferry Boats, or in fact Boats of every description that are permitted to carry for hire, duly registered and numbered. In fact I believe a Bye-Law, similar to the one now in force for the regulating the fares of hired Palkees, would be of advantage, in putting a stop to that continued system of oppression, and on some occasions of actual violence, which is practised by the Boat Manjees for the sake of extorting higher fares than it is necessary to give.

8th, I am not well enough acquainted with the arrangements on the Calcutta side of the River to give an opinion as to what Ghauts ought to be fixed. I am aware of the following Ghauts being in general frequented by passengers wishing to cross to Howrah, viz. Bankshall Ghaut, the Custom House Ghaut, Armenian Ghaut, the Mint and the Haut Khola Ghauts. Except during the freshes, Boats can at all times cross without much difficulty from the state of the tides.

9th, The Ghauts on the Howrah side, I have before mentioned in Para. 1st. These are the only Ghauts that can be made use of by ferry Boats, the intervening shore of the River being altogether enclosed in private property.

10th, With reference to robberies or murders, I can give no information, as all such occurrences are reported to the Calcutta authorities, and are not under my jurisdiction

11th, I can give no certain data as to the pilfering or plundering of goods, though from numerous instances coming to my notice, I have no doubt it is carried on to a great extent, at least in so far as regards pilfering

12th, There are of course in a populous place like Howrah, several parties who are suspected as being receivers of stolen property, but on very few occasions have I been able to get any proof against them.

Secondly. The preventing Obstructions at Publick Ghauts.

1st. There is no doubt as to their being a considerable amount of inconvenience occasioned by Boats remaining a long time in front of the Ghauts, so much so in fact that I have for some months issued a positive order to the Police stationed at the several Ghauts in Howrah, never to allow of Boats occupying a space of five yards in the centre of the Ghaut for a longer time than it is actually necessary to land the passengers and goods they may have brought over.

2nd. It requires however constant attention by the Police to keep this Rule in force, for each successive Boat arriving, will, if possible, try and wait till it has its complement of passengers again. I have sometimes thought of erecting a small Pier or rather Jetty of wood-work or stone thrown together, a few yards in advance of the Ghaut, for passengers to land and depart from. By keeping a Burkundaze in constant attendance near this, all Boats could be kept from remaining longer alongside this than was actually requisite.

3rd, The only Rules in force on this side, for remedying the several inconveniences and malpractices occasioned at the Ghauts I have before explained. They consist merely of Police orders issued by myself, which appear to me absolutely necessary. I regret to add there are no Government Regulations, which in any way tend to remedy the evils complained of.

4th, I have endeavoured to collect what information I could, respecting the probable number of persons residing in Howrah who daily find employment in Calcutta, and believe the following average may be depended upon as being nearly correct.

Writers and persons engaged in different offices, ...	1,000
Coolies, Workmen, Women, &c.	2,000
Total	3,000

5th, I also beg to furnish you with the enclosed statement, showing the number of passengers, as also the traffic which passed daily between Howrah and Calcutta, on the three days therein mentioned. Of the two large Ghauts on this side, viz. the Howrah and Bandah Ghauts, I have given the total of three days. Of the less frequented Ghauts, the Golabarry and Ramkistopore, only that of two days. From this statement it will be observed, that of two days the average of persons crossing at four Ghauts together, was above 20,000.

6th, To enable this large number to be ferried across, there are the following number of Ferry Boats at the respective Ghauts which are Registered in my office, and at the same time have the number of the Boat and the number of the passengers it is permitted to carry, painted in legible Bengalee characters on the front sides of the Boat.

At the Howrah Ghaut, ...	114	Boats of sizes.
,, Bandah Ghaut, ...	123	,,
,, Golabarry Ghaut, ...	38	,,
,, Ramkistopore Ghaut, . ..	49	,,
	324	,,

Thus showing a total of 324.

7th, Hoping the above information may answer the wishes expressed in your Letter.

I have the honour to be,

Sir,

Your most obedient Servant,

E. JENKINS.

HOWRAH :
8th July, 1847.

No. XXX. *a*.

Howrah Ghaut.

Date.	Passengers. Arrival.	Passengers. Departure.	Total.	Horses.	Cows.	Palkees.	Bullock carriages.	Horse carriages.
30th June, ..	4,334	4,601	8,935	7	20	23	6	0
1st July, ..	4,089	5,151	9,240	6	13	18	8	0
2nd July, ..	4,442	4,514	8,956	3	11	7	6	0
Grand Total.	12,865	14,296	27,161	16	44	48	20	0
Average, ..	4,288 1/3	4,765 1/3	9,053 1/2	5 1/4	14 1/3	16	6 1/3	0

Number of registered Boats at this Ghaut.

144

Bandah Ghaut

Date	Passengers. Arrival.	Passengers. Departure.	Total.	Horses.	Cows.	Palkees.	Bullock carriages.	Horse carriages.
30th June, ..	2,083	4,213	6,296	7	4	10	0	0
1st July, ..	2,647	2,840	6,487	2	3	5	0	0
2nd July, ..	2,200	4,280	6,480	7	4	6	0	0
Grand Total	6,930	12,333	19,263	16	11	21	0	0
Average, ..	2,310	4,111	6,421	5 1/4	3 [illegible]	7	0	0

Number of registered Boats at this Ghaut

123

Golabarry Ghaut.

Date.	Passengers. Arrival.	Passengers. Departure.	Total.	Horses.	Cows.	Palkees.	Bullock carriages.	Horse carriages.
30th June, ..	479	814	1,293	0	1	1	0	0
1st July, ..	647	844	1,491	0	2	1	1	0
Grand Total.	1,126	1,658	2,784	0	3	2	1	0
Average, ..	563	829	1,392	0	1 1/2	1	1/2	0

Number of registered Boats at this Ghaut

28

Ramkistopore Ghaut

Date	Passengers. Arrival.	Passengers. Departure	Total.	Horses.	Cows.	Palkees.	Bullock carriages.	Horse carriages.
30th June, ..	1,134	1,937	3,071	1	0	2	0	0
1st July, ..	1,596	1,872	3,468	0	0	3	2	0
Grand Total.	2,730	3,809	6,539	1	0	5	2	0
Average, ..	1,365	1,904 1/2	3,269 1/2	1/2	0	2 1/2	1	0

Number of registered Boats at this Ghaut

49

F. JENKINS,
Magistrate.

No. XXXI.

THE HONORABLE SIR J. P. GRANT, KT.,

Chairman Municipal Committee, Calcutta.

HONORABLE SIR,

I beg to express my extreme regret for not having sooner acknowledged your Letter of the 19th ultimo, and to state that prolonged indisposition and an unusual press of other business, more immediately connected with my Official duties, together with the difficulties I have experienced in obtaining competent persons to collect information, bearing on the important subject of your communication, prevented me from forwarding an earlier reply, and bestowing on it that prompt notice and attention which it deserves. I trust however, that the causes which have led to this delay, and the reasons I have given, will appear to yourself and the Committee, of which you are Chairman, strong and sufficient enough to acquit me of any intentional tardiness or indifference to the matters treated of in the Letter above referred to.

I will now endeavour to comply with the requisitions it contains, and to lay before you, scanty as it is, the information I have been able to gather, with such observations and remarks, as may seem applicable to the points, on which you have done me the honor to request my opinion.

1st. With regard to the suggestion that the superintendence of the River Police should be committed to a separate Officer, on the grounds that the duties of the River Police being added to that of the Town, rendered the Office of Superintendent more complicated and laborious than one Officer could efficiently discharge. I beg to say, that the River Police has had quite as much of my attention as any other portion of the Police, and it does not occur to me that its supervision and management have ever been so irksome or laborious under the present new system and arrangements, as to suggest the necessity of its being placed under separate control. It is not difficult to suppose, that its superintendence was troublesome on the old plan, or that it interfered greatly with other duties connected with the Town Police, but now the former department derives very great assistance from the latter, and a separation would, I think, render the duties of both more complicated and laborious than heretofore. My reasons for supposing so are these—co-operation is a thing which Natives cannot, or will not understand, and co-operation will certainly be desired, if the two bodies are divided, and if it be not of the most earnest kind, the endeavours of both will prove useless to the purposes they were directed, and mischievous to themselves. Then again natives are naturally very prone to recrimination, and apt to shift blame on each other on the most trivial occasions; the proposed measure would afford the two Police an excellent opportunity of indulging this feeling, thereby obstructing work and defeating the object for which they are employed—besides it does not seem at all certain to me, that two distinct bodies, or any class of hired people, having the same duties to perform, vested with the same powers, receiving and acting under different orders, in a large populous City, would cordially unite and make their work a common cause. I am therefore of opinion, that a separation of the River and Town Police, who have so long worked as one body, would not be successful as a measure of improvement: I am moreover persuaded, that a division would, from the want of co-operation it is likely to induce, and the petty jealousies and other bad feelings it is calculated to engender, not only render the position of the Superintendent more complicated and laborious, but infinitely more invidious and disagreeable.

I now take the opportunity, Honorable Sir, of noticing the allusion made in your Letter to the "gang robberies" and theft, which the Committee have been informed still exist. I have to say with reference thereto, that since February 1846, not a single river robbery has taken place, nor has an occurrence of the sort been reported at the Police Office. The Com-

mittee's informant would be doing a public service by desiring the parties robbed to appear at my Office, or by reporting the matter himself, and giving in the names of the sufferers.

There are petty thefts no doubt committed, but until the mercantile community can procure honest Churrundars, and make better arrangements for the protection of their property, or that consigned to them, so long will this state of things continue in spite of all the vigilance the Police may be capable of displaying.

In most cases of river thefts the Churrundar themselves or Sirkars are the thieves, who the sufferers may be it is difficult to ascertain, since when property is recovered or found by the River Police, no proprietors will come forward to claim it, nor is a complaint made that certain articles were stolen, while being conveyed to such and such a ship. Under these circumstances it is a fitting question to ask, who is the sufferer? It is remarkable too, and worthy of notice, that very few instances are known of ships discharging cargo, losing any portion of it. All the principal thefts occur in transit to ships taking it in.

With respect to the suggestion of placing the Ghauts and Ferry Boats under proper management, it would be advisable I think, when proper Laws, Regulations, &c. shall have been framed and passed, to commit that management to the River Police: this would be easily done by increasing the establishment. The obstructed and filthy state of the Ghauts, and the many accidents and deaths that happen from the use of Boats not adapted for Ferry Boats, as well as the crowded state in which they ply to and fro, render the suggestion as a measure of improvement and one worthy of the most serious attention. I regret exceedingly that I have not been able to procure an approximate Estimate of the number of persons who reside in Howrah but gain their livelihood in Calcutta; the various Estimates given to me by the different Mangees, differ so widely, that I could not offer them as a guide.

At one Ghaut, the largest, (Meerbhur) it is calculated that about two hundred and fifty people, residents of Howrah, cross and re-cross daily.

In conclusion I beg again to apologize for the delay which has occurred in replying to your Letter.

I have the honor to be,
Honorable Sir,
Your most obedient Servant,
GEORGE W. S. HICKS, *Captain*,
Superintendent of Police.

CALCUTTA, POLICE OFFICE:
31*st July*, 1847.

No. XXXII.

No. 4044.

To F. J. MOUAT, Esq.,
Secretary to the Medical College.

MY DEAR SIR,

I am directed by the Honorable Sir J. P. Grant to request you to be so good as to state, what is the exact amount of the Estimate for building the proposed Fever Hospital, as Estimated by Major Goodwyn, and noted on his Plan or Gothic Design of a proposed New Medical College and the Hospitals connected with the same? I think, if not giving you too much trouble, it would be best to transmit a copy of the Estimate complete, so as not only to include the Fever Hospital, but all the other buildings connected with the proposed New Medical College. You will at the same time oblige by stating, whether the proposed Hospitals noticed in the Design for a New Medical College, are intended to entirely supersede the present General Hospital, or only to supersede it to the extent of that Hospital being limited to the reception of Military patients only, and not for the reception, as heretofore, of Citizens, Mariners, and others.

I beg to transmit for your information, copy of a Letter No. 4010, of the 1st of April last, which I addressed by order of Sir John Grant, to Major Goodwyn, upon the subject of a fitting site for the proposed Medical College and Fever Hospital, &c.

I am not aware whether any good has resulted by the enquiries that Major Goodwyn may have instituted.

I have not yet been favored with a reply to my Letter to you of the 10th instant, requesting the favor of your stating for the information of Sir John Grant, the dates respectively, when the Medical College and Clinical Hospital were established, and whether the Clinical Hospital when first established, consisted of only one ward. Your answer at your earliest convenience will oblige.

I am, My dear Sir,
Your's very faithfully,
(Signed) J. MORRIS.

MUNICIPAL OFFICE, TOWN HALL:
16th June, 1847.

No. XXXII. *a*.

No. 4010.

To MAJOR H. GOODWYN,
Civil Architect, &c. &c. &c.

SIR,

I am directed by the Honorable Sir John Peter Grant to bring to your notice two spots of ground which are stated to him to present excellent sites, upon which to erect the proposed Fever Hospital and new Medical College, viz: the ground to the North of the New Mint, and the long narrow strip of ground upon a part of which Rajah Sookmoy's Bazar stands, bounded on the North by the New Mint, on the South by the Strand Mills, on the East by Clive Street, and on the West by the Strand Road. The above localities are situated near to those parts of the Town of Calcutta most densely populated by Natives, and offer advantages in respect to being on a high level, and situated close to the River and to the Native Ghauts where the Hindoos burn their dead, and bring their sick at the last supposed stage of a dangerous sickness, by which it is generally apprehended, many lives are unnecessarily sacrificed, and Ghaut Murders committed. The proposed Hospitals, if erected on either of the above-named localities, would possibly act as a check against the above evils.

As some caution may be necessary to prevent an undue enhancement in the value of the property above-noticed, which would, it is apprehended, occur, if it were known that the Government were desirous of becoming its purchaser, I am requested to submit to you whether it would not be advisable to place yourself, in communication with Mr. Fraser or Mr. Crow, the Collector of the Calcutta Ground Tax, and Mr. H. C. Watts, the Collector and Assessor of the Calcutta Assessment, for the purpose of requesting their assistance in ascertaining the most favorable cost at which either of the above spots of ground and the buildings thereon may be purchased. Reference to the Office Records of the Gentlemen above-named, will possibly guide you as to the value of the above property.

Mr. Watts or Mr. Rose, Superintendent of the Roads, will be able to show you the late Major Schalch's Map of Calcutta in 4 or 8 parts, on a very large scale (about 8 or 11 inches to the Mile)—this Map, at the period it was made, exhibits a minute plan of every property in Calcutta, and thus will possibly obviate the necessity of making a fresh survey of the property above-noticed as apparently desirable localities upon which to erect the proposed Fever Hospital and the Medical College.

I have the honor to be,
Sir,
Your most obedient Servant,
(Signed) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE, TOWN HALL:
1st April, 1847.

No. XXXIII.

To J. MORRIS, Esq.,
Clerk of the Municipal Committee.

My Dear Sir,

Illness and inability to consult the records of the College have prevented my replying to your note until now.

The Medical College was opened in April 1835.

The first Hospital attached to it was opened in April 1838, and consisted of a single Ward in a building afterwards used as a Godown, on the site at present occupied by out-offices on the west side of the existing Male Hospital. It was pulled down in 1844 to make room for the present out-offices.

The present Male Hospital was opened in August 1839, to which in 1844 a western Verandah was added.

The Female Hospital was opened in 1841.

Very faithfully yours,
FRED. J. MOUAT.

16*th June*, 1847.

No. XXXIV.

To. J. MORRIS, Esq.,
Clerk of the Municipal Committee.

My Dear Sir,

The first point of your note can only be replied to by Major Goodwyn, to whom I have transferred it for the purpose. The last portion I answered this morning.

Major Goodwyn's Plan is not intended to interfere in any way with the General Hospital, unless the new College should be built upon the ground occupied by that Institution.

Very faithfully yours,
FRED. J. MOUAT.

16*th June*, 1847

No. XXXV.

To J. MORRIS, Esq.,
Clerk of the Municipal Committee.

My Dear Sir,

I send you a copy of Major Goodwyn's reply, to that portion of your letter which I was unable to answer myself.

The subject of the ground now occupied by the General Hospital, is worthy of Sir John Grant's most serious attention, as it will enable all the Plan to be carried out, at one-third of the cost at which it could be accomplished elsewhere, and with great advantage to the public service, as well as to the City. Should Sir John desire it, I can address him officially upon the subject, pointing out all the bearings of the case in this new point of view.

Very faithfully yours,
FRED. J. MOUAT.

Medical College:
19*th June*, 1847

No. XXXV. *a.*

• My Dear Mouat,

You will find Mr. Morris' letter has been under Medical treatment, but I tore it by mistake, and have endeavoured to mend it.

The Estimate entire for all the buildings connected with the new design, for the Medical College is as follows—

Central College building, comprising Council Room, Library, Museum, Curator, Secretary's dwelling and Offices, ...		1,68,380
Buildings on each side, (detached) and retired, being the Fever Hospital on one side, with every accommodation for 360, and the Male and Female Hospital on the other side, also for 360 patients, both buildings having Baths, Privies, and Verandahs, and includes the Eye Infirmary, ... each,	1,30,000	2,60,000
Quarters or Barracks for 150 European and 200 Native Students, with dining and sleeping accommodation, and an arcaded area for wet weather,		92,600
Quarters for Serjeant and Superintendent of Students, ...		22,806
Ditto for House Surgeon with extra accommodation, ...		22,806
Two very extensive Theatres, *i. e.* Theatre-buildings, comprising a Theatre on upper and lower story, with additional Rooms attached, ..		90,720
Dissecting rooms and dead house, ...		10,008
Native tiffin room, Conjee house, Guard room, ...		6,953
Building, for Clinical Clerks, Assistant Apothecaries, &c., Dispensary, ..		26,736
Cookrooms and Privies, extensive ranges of both, ...		19,000
Gateways and Offices attached, ...		6,000
Wells and Tank with Ghats, ...		4,000
Levelling Parade and ground, ...		5,000
Pumps, cisterns, pipes, &c. for the various buildings, ...		20,000
Out-offices, Stables, &c.		5,000

Now these are only approximate Estimates, and would have to be revised before being finally judged upon, and are most probably *above the mark*, for walls have been estimated as solid; making no deductions for openings of doors, &c. The masonry has been assumed at a high figure; the roof, mostly of iron, and the floors of Asphalte, both expensive articles, but which render the Buildings perfect of their kind, and indestructible.

With regard to the General Hospital, I am of opinion, from the number of patients generally in it, that with very slight additions, the design under consideration could easily provide for its Inmates, Surgeons and Establishment.

With regard to the Letter which Sir J. Grant addressed me [through Mr. Morris] relative to the proposed site, be good enough to intimate to him the following reason, for my not having yet replied to it. Deeming the City, and especially the dense part of it, an unwholesome locality for Hospitals, and having ascertained that any land to be purchased for this College, in the City, would cost a very enormous sum of money: I endeavoured to work out the hint which you once gave me, of locating the College on the site of the present General Hospital. There are many reasons why this is the very best spot in all Calcutta for it.

1st. It is the *highest* and healthiest*, and surely where 700 or 800 patients have to be dealt with, and 5 or 600 Students have to reside, the centre of a crowded City is not the best situation.

* Note.—The average height of the ground upon which the General Hospital stands, may be taken to be 10 feet above the level of the surface of the Salt Water Lake—the height of the ground or road at the Allypore bridge, *i. e.* little west of the Hospital, is 12 feet, whilst the ground to the east of the Hospital, *i. e* at the

2ndly. The new locality is near other Hospitals—the Jails and Insanes.

3rdly. It would be most convenient for the attendance at the College, of Assistant Surgeons on their first arrival.

4thly. The ground is the property of Government, and therefore would cost nothing whilst the materials of the General Hospital, would be an offset of 80 or 90,000 Rs. against the expenditure, and the present Medical College and ground if sold, would realize probably at the least $2\frac{1}{2}$ lacs, so that taking a rough calculation of the total cost, the expenditure being probably, ... 7,50,000
Deduct for General Hospital materials and Medical College, ... 3,30,000

Total, 4,20,000

A small enough outlay for such an Institution to make the College effective. In the position I have assigned to it, it would be necessary to erect a number of Dispensaries in the Town where patients would receive immediate treatment, and to which should be attached Doolies* or Vans, for the subsequent conveyance of the sick to the College Hospital. I cannot conceive a better arrangement, and I have the satisfaction to add, that it has received the partial concurrence of the Deputy Governor, who has directed my suggestion as above, to be added to the other documents connected with the project.

I hope you however will submit this both to Sir J. Grant and the Council of Education for their consideration.

Yours sincerely,

18th June, 1847. *(Signed)* H. GOODWYN.

(True Copy)

FRED. J. MOUAT, M. D.

head or South end of the Chowringhee road, is 8 feet, making the average as above stated. The height of the ground along the bank of the River bounded by the Chitpore road on the east, and the River on the west, is from 9 feet to 20 feet, making the average height $14\frac{1}{2}$ feet, and in a neighbourhood open to the River on the west, and to the north and south, not, by the space required for the Hospital, densely crowded. The ground to the east and *south* of the General Hospital is very *low*, filthy, ill drained, full of holes, and very unhealthy, but capable of being improved.

* The sick residing near the bank of the River might be conveyed in Boats, and be taken to the back of the General Hospital through Tolley's Nullah, which passes close to the back of the General Hospital.

J. M.

No. XXXVI.

No. 4052.

To DOCTOR F. J. MOUAT,

Secretary to the Medical College, &c. &c. &c.

My Dear Sir,

I submitted your Letters dated the 16th and 19th instant to my address, to the Honorable Sir J. P. Grant, he directs me to state, that he will be glad if you would address him officially upon the subject of the great advantage to the Public Service, as well as to the City, by erecting the proposed New Medical College and the Hospitals to be connected therewith, upon the site of the present General Hospital.

The favor of your answer at your earliest convenience will oblige.

I am,

My Dear Sir,

Very faithfully yours,

J. MORRIS.

Municipal Office, Town Hall:
21st June, 1847.

No. XXXVII.

To J. MORRIS, Esq.,
Clerk to the Committee.

My Dear Sir,

In reply to your note of the 22nd, I beg to forward the enclosed for communication to Sir John Grant. Upon reflecting over the matter, I found there were several topics upon which I do not feel authorized to enter officially. I have, therefore, thrown it into the form of a private* communication.

I send for Sir John Grant's inspection, an enlarged view of the central portion of Major Goodwyn's design for the New Medical College : kindly let me have it back again when no longer required.

Very faithfully yours,
FRED. J. MOUAT, M. D.

23rd June, 1847.

* Note.—The Fever Hospital and Municipal Committee having applied to Dr. Mouat for permission to print his demi-official Letter, dated the 22nd June 1847, to the Chairman, that gentleman replied that he had no objection whatever to the printing of his Letter, if it is explained that it was written entirely in his private, and had no direct relation to his public capacity, and that his answer dated 7th August 1847, (marked No. XLVI. in this Appendix) to Sir John Grant's Letter of the 2nd instant was also printed.

J. MORRIS.

No. XXXVII. *a.*

The HONORABLE SIR J. P. GRANT, Kt.,
President Fever Hospital Committee.

My Dear Sir,

In accordance with your wish, communicated through Mr. Morris, to be informed of my reasons for supposing the site of the present General Hospital to be eligible for a New Medical College, I have the honor to furnish the subjoined statement upon the subject, premising that I am not in possession of any records or official documents respecting the General Hospital, to enable me to speak with confidence upon some of the points to which I shall refer, connected with that Institution.

2. In the first place the situation is well adapted for Hospitals, Theatres, &c. and the amount of ground in the possession of Government is adequate for the construction of a New College in all departments, with a very trifling additional outlay : whereas, I am given to understand, that no site of adequate dimensions within the boundaries of the City, or in any other equally eligible situation, can be obtained under a cost of four or five Lacs of Rupees.

3. Major Goodwyn has shewn in his demi-official Letter the amount that will be at the disposal of Government from the value of the materials of the present General Hospital, and of the ground and buildings of the existing Medical College. In addition to this, he might have added the combined sum at the disposal of the Council of Education for the construction of a Fever Hospital, which will reduce the actual cost still further, to the extent of rather more than a Lac of Rupees.

4. I have no returns by me to exhibit the average number of civil patients treated in the General Hospital during the last half century, but supposing them in both Male and Female Wards, including all seasons and epidemic visitations of disease, not to exceed 100

persons,* they would only occupy three, or at the utmost four wards of the proposed Hospital for Europeans, and every duty connected with them might be efficiently discharged, by appointing from among the present Professors, a Clinical Physician and Surgeon, and dividing the duties between them, without any additional cost to the Government.

It would not of course be right, nor do I pretend to recommend, that present incumbents should in any way be interfered with. They might continue to discharge their duties until their promotion, when their appointments would necessarily lapse. Still less should I presume to advocate any interference with the present eminent and excellent Surgeon of the General Hospital, Mr. Nicolson, an Officer of distinguished attainments and long service, universally respected by his professional brethren; and if all the Hospitals in the New Medical College were placed under his personal control, I am quite convinced that every Officer connected with the Institution would gladly serve under so able a chief.

5. The Military Hospital might, as at present, remain separate, with quarters for its own Officers, Establishment, and for such Assistant Surgeons as may from time to time arrive from England, and the employment of the latter could easily be rendered more profitable to the State than can be accomplished under the existing system; but these are questions on which I am precluded from entering, unless called upon by authority to afford information regarding them.

6. The greater number of the present European patients of the General Hospital pay a small sum for their diet, &c. during the period they are under treatment.

In the Medical College Hospitals, they are treated and dieted gratuitously, which would, I think, be regarded as a boon by many of the poorer members of the community. It would entail little additional expense to furnish suitable accommodation for the better classes of patients resorting to the General Hospital, in which every attention would be paid to the degree of privacy and retirement they might desire.

7. The greatest wants of the present College are Hospital accommodation and Clinical Instruction. The General Hospital is near the Eye Infirmary, close to the Institution for the treatment of the Insane, with the Jail and Militia Hospitals in its vicinity, all of which might, in communication between the Government and the Medical Board, and under proper regulations, be rendered available for the purposes of the New College, without any additional expense to Government.

8. Another point of some consideration to Government is the expense of maintaining the Subordinate Medical Establishment now attached to the General Hospital. A small addition to the same department of the Medical College, could perform the whole of the duty required, at a comparatively trifling extra cost.

As the whole of the European Medical Subordinates are hereafter to be educated at the Medical College, and as the accommodation provided for them might be made to include those of the same branch of the public service, who are temporarily at the Presidency, the end to be attained by placing the College in the position of the General Hospital would be considerably enhanced, by enabling all to take advantage of the means of instruction afforded by the Museum, Laboratory, and Dissecting Rooms of the Institution.

9. I was informed by the late Drs. McLeod and Murray, Inspectors General of H. M's. Hospitals in India, that prior to the building of the present Sudder Dewany Adawlut, then intended for a Military Hospital, Committees were ordered to assemble and report upon the deficiencies existing in the General Hospital, and its inapplicability to the purposes for which it is used.

* Since the above was written, I have made enquiry on the subject, and have reason to believe that the real average would be found not to be more than one-half.

FRED. J. MOUAT, M. D.

I have not seen those documents, but as they doubtless exist in the records of the Military Department of Government, it might be useful to consult them, with reference to the several questions now mooted.

10. Among the chief objections to the removal of the College so far from the City, are the great distance from which bodies must be brought for dissection; the number of sick persons in the densely populated parts of the Town who would be further removed from Medical and Surgical aid: and the delay that would occur in sending Police cases so far from the immediate neighbourhood in which they generally occur.

11. The first could readily be obviated, by the employment of two covered carts, and the use of ponies instead of bullocks, the expense of which would be defrayed from the contingent allowance of the Dissecting Department. A special Chuprassee is always sent with these carts to prevent their being converted into a source of extortion and annoyance to the persons living on the line of road through which they are compelled to pass. From Nimtollah Ghaut they would cross at once to the Circular Road, skirting along which, they would reach the New Medical College without passing through any other thoroughfare, and as they are locked up, few, if any, of the passers by, would be aware of their contents.

Again, they are sent to the Ghaut with the dissected remains at midnight, and return with the fresh subjects at daybreak, when few are abroad or likely to be disturbed by them.

They are also carefully watched by the Police to see that there is no unnecessary detention or exposure in transit.

12. Two extra Dispensaries would, I think, be amply adequate to prevent any great inconvenience arising from the removal of the present College Hospital in Putuldangah. The expense of maintaining these I am unable to state, but it may be readily ascertained from the records of the Native Hospital.

To each should be attached a couple of doolees, for the transport of severe surgical cases, which would not bear the shaking of a wheeled conveyance, and at the Police Office might be kept a large covered Van for carrying all other cases requiring in-door hospital treatment.

If these means were generally made known throughout the Bazars, and the various Police Thannahs were furnished with a few printed simple regulations upon the subject, the Native population would soon resort to them. Cases are often brought at present to the Medical College Hospital from distant places on hackeries, in doolees, palanquins, or any other conveyance which the villagers are able to afford or procure.

Again, the vicinity of the General Hospital itself is densely populated, and would afford a large number of cases of diseases of all classes.

13. To the Students it would not be a source of any very great inconvenience, for the majority of them now procure lodgings in the neighbourhood of the College, and would doubtless migrate to whatever place the institution might be removed to.

The Military Class and European Subordinates reside entirely on the premises, and many more of the English Department would do the same, if suitable quarters were provided for them, as will be the case in the proposed New College.

14. This communication has already extended to so great a length, that I am unwilling to add more at present, but I shall be happy to afford any additional information you may require upon particular points, if you will kindly intimate your wishes to me.

I remain, My dear Sir,

Very truly yours,

FRED. J. MOUAT, M. D.

MEDICAL COLLEGE:
June 22*nd*, 1847.

No. XXXVIII.

No. 4077.

From THE HONORABLE SIR J. P. GRANT,
Chairman of the Municipal Committee,

To DOCTOR F. J. MOUAT,
Secretary to the Council of Education.

My Dear Sir,

The pressure of business in the Court has delayed my answer to your Letter of the 22nd of June, which I duly received from Mr. Morris, and which required some consideration.

All the information necessary with regard to the eligibility of the site of the General Hospital for a Fever or other Hospital for Civil and Nautical patients, with whom alone we have to do, and all the history and medical statisticks of that Hospital, so far as they could be ascertained, you will have found in the First Report of our Committee and its Appendices, which have been sent you, I understand, by Mr. Morris.

1. In regard to the salubrity of its site we had the decided opinion of Mr. Nicolson, Mr. Martin, and Dr. Macleod, which we have abstracted on pages 230, 231, and which are printed at length in Appendix F.

Mr. Nicolson's opinion, that while the plain surrounding the enclosure remained clear and unoccupied, it must have formed an eligible situation for an Hospital, throws no light upon its present eligibility for that purpose, which, from his account of the state of its immediate vicinity, for several years before, and at the time he gave his evidence, is just what it is represented to be by Mr. Martin and Dr. Macleod—both good judges—the latter probably one of the persons of the best judgment and most extensive experience and accurate knowledge, of the salubrity of Hospital sites in all parts of the world, of any man then in the British Dominions.

Its distance from the town and Harbour—the deleterious and dangerous consequences of this distance—are forcibly pointed out on pages 232, 233, and the Appendix referred to in our First Report.

It is true that the construction of the General Hospital is dwelt upon by Mr. Martin and Dr. Macleod, in addition to its site and its distance, as a great cause of its insalubrity. Dr. Macleod says, "that in point of situation it is obnoxious to all the disadvantages stated as attaching to that of the Regimental Hospital—But in regard to its distance from Calcutta, that is an inconvenience peculiarly its own."—It is true therefore, that the badness of its construction must be taken into consideration along with the unhealthiness of the site and its distance from the City and port, whence its patients had to be brought, in estimating the causes of the excessive mortality that has prevailed in it, yet a large share cannot but be ascribed to those latter causes, though to what amount may be doubtful—But that the ratio of mortality in the General Hospital has been lamentably great is certain, amounting on an average of 5 years to 146 per cent; while the average in the Hospitals of Rome, the country surrounding which is subject to the same deleterious miasmata with that in which Calcutta stands, is only 10 per cent.

First Report, page 237.

I can therefore see no reason to induce me to alter the opinion which in common with every other Member of our Committee—for we were quite unanimous—and after the most careful consideration—I then formed, that although the General Hospital "should be rendered, "as far as the building was concerned, a sufficiently good Hospital, it was yet by its insalu- "brious situation, from dampness, by its want of a free circulation of air, by the vicinity of

"the nuisances which surround it, and by the noxious exhalations which infest it, and added "to these, in the opinion of your Committee, by the insuperable objection of its distance "from the Town and Port of Calcutta, rendered extremely unfit for the purposes of a General Hospital for the European and American sojourners in this Capital and its Port."

I for one therefore could not see the new Hospital placed on that site without great apprehension—and even if, under the Act for improving the salubrity of the Town when in full operation, the site might be rendered less unhealthy, I should consider its distance from the Town and Harbour an insuperable objection.

I am quite aware of the economical considerations so clearly, and in his capacity of an Architect, so properly pointed out by Major Goodwyn—But there can be no economy in building an Hospital in an unwholesome situation, and at so remote a distance from the population and the harbour, as to impede its usefulness in all cases, and to render it utterly useless in many, though at a less sum of money than would be necessary to build one of the same size in a situation free from these obstructions to its usefulness.—The answer to such a proposition is, if you have not funds to build so large an Hospital on an eligible site, build a smaller one—but let the site be such as may not prevent its answering the purposes for which it is built; and when your funds improve, add to it—or build another in its vicinity—If you do otherwise, you will build not an useful Hospital but a splendid Tomb—Accordingly that was the plan proposed by your Committee (page 282). I would particularly request your attention to the very sensible and indeed able Letter of Captain Fitzgerald to me, printed in Appendix F. to our First Report (No. 62 page 177).

But it is far from being established as it appears to me, that, when the necessity, admitted by Major Goodwyn to be created by erecting the Hospital at so great a distance, for erecting a "number of Dispensaries where patients would receive immediate treatment, to which should be attached Doolies or Vans for the subsequent conveyance of the sick to the College Hospital" is taken into consideration, the saving will be nearly so great as is estimated by him. These patients cannot receive immediate treatment with safety to their lives, except at the hands of skilful Apothecaries and Surgeons, with the assistance of good nurses and other attendants, a competent number of which, with suitable beds, in healthy and well constructed apartments, must be kept up at each Dispensary—which, in truth, must be a small Hospital. The expense of erecting a small Hospital, capable of receiving 20 patients, is estimated by Captain Fitzgerald at Rupees 37,021 : 8 : 1. If we should suppose the proposed Dispensaries to cost only one-third, greatly I suppose under the mark, and that no more than six were erected for the whole of the long and populous Native Town, the cost would be Rupees 74,043.—To this would have to be added the annual cost of repairs and Establishment—and the certainty of much less careful and skilful treatment, in generally the most important and in the usually too long delayed cases of the poor, the most critical stage of the disease—In cholera, in all cases—and in many cases of the acute diseases the patient must continue to be treated where he is first taken till he recovers or dies—and in many more cases he must continue to be treated there, till that treatment shall have so far subdued or mitigated the disease as to enable him to be carried with safety, a distance of from 5 or 6 to 2 miles, in the broiling sun of the day, with the thermometer nearly at fever heat—or the chill and damp air of the night and morning. The extreme danger of the patients being so carried in the early stages of most diseases, and the consequences of delay in those stages are forcibly pointed out by Dr. Macleod and Dr. Graham, (1st Report, pages 232, 233, Appendix F. page 254.)

There is no doubt "that the heart of a city, especially the densely inhabited part of it, "must be a most unwholesome locality for Hospitals—" but in the case of a city very long and comparatively narrow, like Calcutta, the proper site for Hospitals is the outskirts at the sides of it—here the river side or the College Streets and neighbouring Squares—if the ground

of the latter is sufficiently high and free, or capable of being rendered by draining, free from deleterious miasma—surely the preferring to such a site, one at an end of such city, and at a great distance beyond it, would seem not easily accounted for. It is certain that the present site of the College Hospital is well suited to the convenience of the inhabitants from the numbers who resort to it, and the still greater number which from your Report are desirous of doing so, if its dimensions were sufficient to receive them.

It is very necessary that the Medical College and Hospital or Hospitals should be near together, but not at all that they should be in the same building. I imagine both the Professors and the Medical attendants would prefer their being in separate buildings.

It has been suggested to me that the present Medical College and Hospital might, at no great expence, be thrown into one, forming a spacious and commodious building, solely appropriated to the College, and consisting of all the apartments as Library, Theatre, &c. &c. requisite to such a school of learning—and that an Hospital or Hospitals might be built in its immediate vicinity in an airy and healthy locality.

It has been also suggested to me, that the congregating of sick persons in the wards of one Hospital in such numbers as the amount of sick persons and the variety of diseases which abound here, require to be accommodated and treated, is an experiment which has not yet been tried in the climate of India—and that it might be advisable to erect separate Hospitals of sufficiently ample dimensions and contiguous—but calculated for the reception of a smaller number of persons in each, than it is now proposed to receive in the Hospitals projected.

I am, My dear Sir,
Most sincerely yours.
(Signed) J. P. GRANT,
Chairman of the Fever Hospital Committee.

MUNICIPAL OFFICE, TOWN HALL:
2nd August, 1847.

No. XXXIX.

CIRCULAR.

[*Addressed to the Members of the Fever Hospital and Municipal Committee.*]

The Chairman begs to submit for the consideration of the Members of the Committee the Correspondence* which has passed with the Secretary to the Council of Education, relative to the proposed site of the Fever Hospital, on which he requests the opinions of the Committee.

* Marked No. XXXII. to No. XXXVIII. in this Appendix.

MUNICIPAL OFFICE, TOWN HALL:
17th July, 1847.

No. XL.

Minute by J. GRANT, ESQ., Senior Surgeon, Apothecary H. E. I. C. Member of the Fever Hospital and Municipal Committee.

From personal observation and experience of long standing, I am enabled to bear testimony to the great cogency and accuracy of the objections stated by Sir John Peter Grant, to the space occupied by the General Hospital as the site of a Medical College, or of a Fever Hospital for Natives. Even leaving all other objections on one side, I conceive that the great distance from the general centre of native population is a conclusive one. In regard to the

General Hospital itself, as an Institution founded and maintained by the State, I am not called upon to give any opinion ; neither am I disposed gratuitously to entertain any question here respecting organic changes having reference to it as an Institution. I simply enter my protest against the ground it occupies, being selected as the site for a Fever Hospital, or for a Medical College. Concurring in the grounds of objection laid down by our Chairman, it is to me also a grave one that the site of the General Hospital is beyond the jurisdiction of the Coroner of Calcutta, so that cases of suspicious or violent death occurring in that site, though the outrage or accident might occur in the town, would be entirely beyond the cognizance of the Coroner. This is no hypothetical idea, since during the time that I was myself permanent Senior Assistant Surgeon at the General Hospital, a most suspicious case occurred, in which the first Officer of a Ship was brought under night *to die* at the General Hospital, and a reference being made to the Coroner he declined an inquest, and the Magistrate of the 24-Pergunnahs on being applied to, deemed it a case beyond his province or his means to enquire into.

The chief grounds (as I understand) on which the Secretary to the Council of Education proposes the site alluded to *(See para. 7 of his letter)*, are its proximity to the Eye Infirmary, to the Institution for the treatment of the Insane, and the vicinity of the Jail and Militia Hospitals. The Eye Infirmary, even supposing the site desirable in other respects, would still be at a considerable distance from it. It is also an independent Institution, and removable at any time to some other site should it appear expedient. Formerly there was a branch Eye Infirmary connected with the large or primary institution close to the Medical College. It was under the care of Mr. Raleigh. If it is deemed absolutely necessary that the Students of the Medical College should attend an Hospital entirely devoted to eye diseases, it may be desirable to revive the branch Eye Hospital, or a ward of the College Hospital might be devoted to the purpose, for so rife are eye diseases in and about Calcutta, that there would be no paucity of patients were the means of relief even more extensive than they are.

In regard to the proximity of the Insane Hospital to the proposed site, I may observe, that the clinical consideration of insanity scarcely enters into the internal curriculum of a Medical Institution. The consideration of the subject *clinically* is usually left very much to the Students themselves, who certainly might very wisely devote the many holidays which the privilege of Sundays extended to them affords, for paying a visit to the Insane Hospital, should their doing so not be objected to by the Superintendent.

The Jail Hospital may be left entirely out of view—I had the charge of it myself formerly, when the average daily number of patients scarcely ever exceeded three or thereabouts.

The Militia Hospital is at a considerable distance from the proposed site, but even if it were closer, it would not, it strikes me, weigh a feather in the argument. I had myself charge of the Militia Hospital for some years. The corps is much broken up into detachments scattered over the country. The quota of sick in Hospital may then be considered as furnished by the three or four hundred men absolutely present in the lines. The regularity and uniformity of the Sepoy's life, and his being generally better fed and clothed, and more looked after than Natives of any other class, as repects habits of *cleanliness*, &c. render him generally more healthy. We shall not find therefore among Sepoys the same variety or extent of disease, that may be looked for in a miscellaneous Town population.

On the whole then I do not deem the reasoning of the Secretary to the Council of Education for the adoption of the site alluded to, as at all convincing. In paragraph 10, my worthy friend has stated the chief objections to the removal of the College so far from the City, but has not at all succeeded in satisfying my mind that the expedients he proposes for remedying them, would meet the object in view. This is especially the case as respects the supply of subjects for dissection. These are proposed to be conveyed in covered carts by the Circular Road, and across the high road fronting the General Hospital. As the population of

the Circular Road consists principally of Europeans or East Indians. I am satisfied that they would not be very well pleased with the arrangement. I have not sufficient confidence in Native superintendence, as not to have grounds for apprehension, that revolting displays might take place by accidents occurring to the carts to or fro. Add also, that a portion of the route is the daily ground of exercise, at an early hour, to European ladies and gentlemen on horseback, or in wheeled vehicles, &c.

The dense population in the vicinity of the General Hospital the Secretary thinks would afford a large number of cases of diseases of all classes. The inducement held forth is not sufficiently great to outweigh the objections against removal from the centre of a still denser population. Add to this, that the population of the proposed site consists principally of squatters of the very lowest class, sweepers and matmakers, &c. There would, I imagine, be very great difficulty for the Students to lodge themselves conveniently near the site, especially with reference to the allottees alluded to.

There is no absolute necessity for any of the Hospitals to be within the compound of the Medical College. I conceive then, that the present site of the College is amply sufficient for it on an amended Plan, consistent with which the Lying-in Institution and the Hospital might be erected on ground not far from that Institution, such I presume being available.

H. C. DISPENSARY.
22nd July, 1847

J. GRANT, *Senior Surgeon, Apothecary, H. E. I. Co*

No. XLI.

Minute by A. ROGERS, ESQ., Member of the Fever Hospital and Municipal Committee.

I fully concur in the opinions expressed by Sir John Peter Grant in respect to the ineligibility of the space now occupied by the General Hospital as a site to build the Medical College upon.

I have considerable apprehension also of the wholesomeness of the site now occupied by the present Medical College. That neighbourhood being crowded, badly ventilated, and badly drained (sewerage it has none). The combined effects of these great generators of disease would, I fear, retard and render its cure more than usually precarious. I would submit for consideration, the propriety of making application to the Government for a space to build the College upon, (now occupied by stone breakers, and a small house, both the property of Government,) bounded on the South by Coillah Ghaut Street, on the North by the Custom House Godowns, on the East by the Old Import Warehouse, now the Pay Office, and on the West by the Strand and the River—Should that site not be obtainable, it is possible the Government might grant space for the College in one of the Front ranges of the Square of Public Buildings proposed to be erected on the Strand, now occupied by the Post Office, Salt Board, Bankshall, and Mackintosh's Building Yard—and failing that, the Frontage belonging to Government between the Metcalfe Hall and Mr. Goldsworthy's, on the Strand.

21st July, 1847

A. ROGERS

No. XLII.

Minute by W. P. Grant, Esq., Member of the Fever Hospital and Municipal Committee.

I disapprove of the site of the present General Hospital being adapted for that of the proposed Fever Hospital. Its distance from all the sources from which its patients would be derived is to me an insuperable objection. I do not lay much stress on the comparative salubrity of one spot over another, in an area of ground, the natural circumstances of which are so nearly alike in every part, as that on which this Town stands—and I am strongly of opinion, that most, if not all local disadvantages of any particular spot in such an area, can be removed by artificial means. Proximity to the River is an important circumstance in a place where no system of sewerage exists.

So far from thinking the heart of a City the worst situation for an Hospital, I conceive a well ventilated and well drained spot in the heart of a City the best possible situation for such an Institution. And I do not think it impossible, or even very difficult to ventilate and drain such a spot in the heart of Calcutta

W. P GRANT

No. XLIII.

Minute by J. H. Patton, Esq., Member of the Fever Hospital and Municipal Committee.

I concur

J H PATTON

No. XLIV.

Minute by Major H. Goodwyn, Member of the Fever Hospital and Municipal Committee.

I have already expressed my opinion in my letter 18th June last, to the address of Dr Mouat—and am in favor of the General Hospital site for reasons therein stated—nor have the arguments to the contrary induced me to change my opinion.

H. G.

No. XLV.

Minute by F. P. Strong, Esq., Member of the Fever Hospital and Municipal Committee.

If the Medical College and Hospitals are to be all in one compound (which I am of opinion is not desirable), the most eligible parts of the native Town I consider to be the two sites mentioned in Mr. Morris's letter to Major Goodwyn, viz. on the banks of the River, North and South of the New Mint, the first commencing from Patooria Ghat to Haherytolla Ghat, and the second from Rajah Sookmoy Roy's Bazar to the Strand Mills. The first-named locality is occupied almost entirely by timber yards and low huts, and the latter by delapidated pucka buildings, and includes the Burrah Bazar. This spot would be highly eligible, but much more expensive than the other more northern ground; but if these two localities should be considered too expensive, and the College and Hospitals not be together, then the Medical College and its Hospital might remain where they now stand, and two sufficiently large and good Subsidiary Hospitals be erected on two other localities, such as might be considered most eligible—say one upon one of the sites already mentioned fronting the River

near where the Hindoos dispose of their dead—and the other might be (if ground could be obtained) nearer to the Mahommedan and Christian population, but as centrical as possible. If it were easy and desirable to remove the Free School, which is not far from the Mahommedan College, to either the School House and grounds already most eligibly fitted for such purpose, lately vacated by the Boys of the Upper Orphan School at Allipore, and now to be sold or let, or to a part of the premises of the General Hospital, which is Government property, that site might be worthy of consideration. The Free School ground is highly centrical and eligible, and if the General Hospital locality was finally adopted for the School, I think the outlay would be greatly lessened—and both these localities, as well as the site of the present Medical College, I consider capable of better drainage, ventilation, and improvement. As regards the School and grounds at Allipore, I firmly believe their situation to be the most healthy of all our Suburbs, and therefore feel no hesitation in recommending that site for this most valuable and excellent School. I am also informed that the large splendid Asylum and its ground contiguous to these premises, and now occupied by the Ladies, is likely soon to be available—but this is in some degree uncertain. This Asylum has been proved by statistical tests to have been for many years in the highest degree healthy to its inmates.

Should it appear inconsistent that among my suggestions I propose the site of the General Hospital for a School, having formerly alluded in a paper among my letters in possession of our Committee, to the fact of the late Dr. Buchanan's Statement in his Report to Lord Wellesley, on the impurities then existing in our Southern Suburbs, that the grounds behind the General Hospital had been represented as having been injurious to the Invalids in Hospital, I beg to record my opinion that I consider those grounds are as capable of being rendered healthy as Cornwallis Square has been made since the time when the late Bishop Heber recorded that neighbourhood to be so dreadfully unhealthy—and I myself can vouch for the correctness of the Bishop's opinion at that time, having had to pass through intricate roads, jungle, and jeel, to visit the sick. The Square is now healthy, and can boast of handsome public buildings and establishments, including a Christian Church, with its Resident Clergyman. Surely by the same appliances any part of Calcutta, or its Suburbs, may be made equally healthy. I have recorded my opinion, that our Suburbs are more unhealthy than our City; it may here be remarked, that the Suburban inhabitants nearly equal those of the City in number, and it is to the general causes of sickness in these parts, as well as also in the City, and to the removal of these malarial causes of disease, that I have principally directed my attention. I really believe that if the Magistrate of the Suburbs, Mr. John Master's advice, after my Report to Government in 1828, upon the general unhealthiness of all those lands, had been followed up in the Eastern Suburbs, and his suggested improvements (which I have marked in the Map in our Committee's Room) adopted, that thousands of lives would have been saved, and it is not now too late to commence such improvements generally throughout all our Suburbs. Should we not succeed in obtaining a site for an Hospital at or near the Free School, then probably the locality recommended by Mr. Rogers near the Custom House, or that between the Public Library and Mr. Goldsworthy's house, if sufficient ground on either of these positions can be obtained, would be desirable. In such case the two Hospitals would be situated on healthy and public sites on the Strand. I believe the ground near the Custom House belongs to Government, but to what extent I am not aware. I fear any landed property along the Strand Road would be valued very high, much more so than land near the Free School—An eligible site, and sufficiently large for the College and Hospitals probably, is situated near this, bounded on the North by Jaun Bazar Road, on the South by the Mahommedan College, and on the West by the Wellesley Road, going by the name I believe of Classitola, a collection of filthy huts and Bazars—I am informed that land in these parts would be reasonable.

FRANCIS PEMBLE STRONG.

No. XLVI.

The HONORABLE SIR J. P. GRANT, Kt.,

Chairman of the Fever Hospital and Municipal Inquiry Committee.

My Dear Sir,

With reference to your obliging communication of the 2nd August, in reply to my letter of the 22nd of June, I trust you will permit me to make a few brief remarks touching some of the observations I have therein ventured to make

2nd. Much of the valuable evidence concerning the ineligibility of the site of the present General Hospital accumulated in your Committee's records, has only come under my notice since my letter was written. I have carefully perused and weighed it, and, so far as was practicable during the present rains, have visited and examined the neighbourhood of the General Hospital.

With every deference and respect for the opinions of such eminently practical and well informed observers, as the late Inspector General Macleod, and Messrs. Nicolson and Martin, I cannot entirely coincide in their views, and consider, that if the ground upon which the General Hospital stands, were artificially elevated to the extent that might be accomplished with the earth from the foundations of the new buildings; were perfectly and properly drained, with a clear space of sufficient extent on every side, and surrounded by no dead walls; and if the neighbouring village were also kept in a fit state of salubrity, instead of being the receptacle of filth, of which it has the appearance at present—that its position would in every respect be well adapted for the purposes of a new College and Hospitals attached to it.

3rd. The distance from the Town and Port of Calcutta, is, I think, the greatest and most formidable objection, and upon this, after more mature reflection, I am inclined entirely to retract my former opinion, and to coincide in your views and those of the Committee.

4th. I quite agree with you that the Medical College and its Hospitals should not be in the same building. I would even separate their compounds by a light iron railing, so as to prevent direct access from the one to the other, as now obtains with much inconvenience to the Institution, and no good to the patients.

They ought, however, to be immediately contiguous, so as to be readily, easily, and rapidly accessible to the pupils, with as little exposure as possible to the sun and rain.

The two establishments ought also to be quite distinct, and on no account permitted to be mixed together, which cannot at present be avoided and is productive of no little inconvenience and annoyance.

5th. You mention a suggestion which has been made to you to the effect, "that the present Medical College and Hospital might, at no great expense, be thrown into one, forming a spacious and commodious building, solely appropriated to the College, and consisting of all the apartments, as Library, Theatre, &c. &c. requisite to such a School of Learning; and that an Hospital or Hospitals might be built in its immediate vicinity in an airy and healthy locality."

From a long and intimate acquaintance with every portion of the present buildings, I fear that the proposed plan would be one of considerable difficulty, and great expense—not however, by any means impracticable, and if the Institution is to remain in the City, the suggestion appears to me to be deserving of every consideration.

6th. The last paragraph of your Letter contains matter for very grave consideration, upon which I am not prepared to give an immediate reply.

I remain,

My dear Sir,

Your's very sincerely and obliged,

FRED. J. MOUAT, M. D.

Medical College:

7th August, 1847.

No. XLVII.

No. 1336.

To THE HONORABLE SIR J. P. GRANT, Kt.,
Chairman of the Fever Hospital and Municipal Committee.

Judicial Department.

Honorable Sir,

I am directed to acknowledge the Committee's Report and Appendices relative to the establishment of a Fever Hospital in Calcutta, and the appointment of a Metropolitan Municipal Corporation, and to convey to yourself and the other gentlemen composing the Committee, the best thanks of the Right Honorable the Governor of Bengal, for the very able manner in which your enquiries have been conducted, and their result digested and reported.

I have the honor to be,
Honorable Sir,
Your obedient humble Servant,
(Signed) FRED. JAS. HALLIDAY,
Secretary to the Government of Bengal.

Fort William :
The 11th August, 1840.

No. XLVIII.

In Circulation.

To THE MEMBERS OF THE COMMITTEE UPON THE FEVER HOSPITAL AND MUNICIPAL IMPROVEMENTS.

The Chairman has very great pleasure in announcing to the Members of this Committee that the Government of Bengal has communicated to him through Mr. Halliday, its Secretary, on the subject of preparing a Draft Act to be submitted to the local Legislature, "for the purposes of the Improvements proposed in the First Report of our Committee, "empowering the Bengal Government to borrow money on certain assigned Revenues, and "to purchase lands and houses, and in short to carry out the scheme," and requesting the Chairman's assistance in fixing upon a person fitted to draw such Draft Act.

The Chairman lost no time in offering his services to superintend the framing of the Draft if the Government would authorize him to employ a Barrister to put together the matters of detail, which his other duties would not admit of his personally undertaking, and he added, that he had most fortunately received by a late mail, from a former most respected and valuable Member of this Committee, Dr. Martin, now a Member of the Commission appointed by Her Majesty, for enquiring into the state of Towns and populous Districts in England and Wales, the Reports of that Commission, with the Evidence and Appendices, and also the Bill prepared and brought by the Earl of Lincoln and Sir James Graham, for the improvement of the sewerage and other matters connected with the health of the inhabitants of such places noticed in those Reports, which Bill was ordered by the House of Commons to be printed on the 25th of July last, and stands over for consideration during the recess, and which Reports and Bill would be of essential service in framing the Draft Act for Calcutta.

The Chairman suggested Mr. Wylie, the Barrister as his Assistant, to all which Sir Herbert Maddock has at once assented, as has also Mr. Wylie.

This last-mentioned Gentleman is now therefore employed, under the Chairman's supervision, in framing the Draft Act desired, which, when completed, the Chairman will have the pleasure of submitting to the inspection of the Committee, before sending it in to Government.

The Draft Act proposed by the Deputy Governor of Bengal is generally "for carrying into effect the suggestions of the Municipal Committee." It will therefore embrace as well the establishment of a Fever Hospital as the other Sanatory Improvements which our Committee has recommended.

The Chairman has been engaged in framing the Draft of the Second or Supplemental Report of the Committee on the Salt Water Lake, the Canals, &c.—but he was interrupted by his absence from Calcutta, and latterly by the necessity of making himself master of the Reports of the English Commissioners, and their voluminous, but most interesting Appendices, with a view to the carrying into effect the great measure at length adopted by the Government, and which formerly occupied so much of our Committee's time and care in its investigation, and in which we cannot but continue to take so deep an interest.

The Chairman by procuring an inspection of public records, and by addressing Queries to several persons conversant in such matters, has obtained a great deal of information relative to the subjects to be embraced by the Second Report, without putting the Committee to the trouble of Meeting. These he will have the honour of laying before them, when the Draft of the Report is more advanced, and of taking their further instructions upon.

MUNICIPAL OFFICE, TOWN HALL:
The 14th November, 1845.

No. XLIX.

CIRCULAR.

To THE MEMBERS OF THE COMMITTEE UPON THE FEVER HOSPITAL AND MUNICIPAL IMPROVEMENTS.

The Chairman has the pleasure to circulate for the information of the Committee, Copy of a Letter of date the 7th November 1846, which he has had the honour to receive from the President of the Council of India in Council, expressing in very flattering terms, the thanks of the Council of India to the Chairman and Members of the Municipal Committee, for our labours in endeavouring to promote the Sanatory Improvements of the Town of Calcutta, and of his answer to the said Letter, dated the 11th Instant—and the Chairman sincerely congratulates the Members of the Municipal Committee, upon the assurance afforded by this communication from the Government of India, that the great public measure which the Committee have so long contemplated, and so anxiously recommended to the consideration of Government, is now in the course of being carried into effect.

The Chairman has directed a Copy of this Correspondence, to be inserted in the Records of the Committee.

COMMITTEE ROOM, TOWN HALL:
12th November, 1846.

No. XLIX. *a.*

No 697.

To THE HONORABLE SIR J. P. GRANT, Kt.

Home Department—Legislative.

Honorable Sir,

The Government of India have received through the Government of Bengal, the Report of the Municipal Committee, relative to the Sanatory Improvements of the Town of Calcutta, together with the Draft Act framed by you for this purpose.

2. We take the opportunity of your return to the Presidency, to assure you, that the Government of India and the Community of Calcutta, are under great obligations to you for the humanity, ability, and energy with which you have devoted your time to this subject since 1835, when you presided over the labours of the Committee; and we should have rejoiced, if, before the termination of your official duties in India, you could have witnessed the success of a great Public measure, with which your name will ever be most honorably associated as the indefatigable friend of social improvement.

3. The advantage which the public interests will derive, when this measure is in full operation, will be mainly due to the meritorious labors of yourself, your able co-adjutor Dr. Martin, and the other Gentlemen whose names are affixed to the Report.

4. In the name of the Government of India, and as a sincere testimony of our high respect, we request you will receive our warmest thanks, for your valuable services in promoting this great practical measure.

We have the honor to be,
Honorable Sir,
Your most faithful humble Servants.

Council Chamber:
The 7th November, 1846

(Signed) T. H. MADDOCK,
,, F. MILLETT,
,, C. H. CAMERON.

No. XLIX. *b.*

To THE HONORABLE THE PRESIDENT OF THE COUNCIL OF INDIA IN COUNCIL.

Honorable Sir,

I had yesterday the honour to receive your Letter, of the 7th Instant, acquainting me that the Government of India had received through the Government of Bengal, the Report of the Municipal Committee, relative to the Sanatory Improvement of the Town of Calcutta, together with the Draft Act framed by me for that purpose, and assuring me that the Government of India and the Community of Calcutta, are under great obligations to me for having devoted my time to this subject, and in the name of the Government of India, and as a sincere testimony of your high respect, requesting me to receive your warmest thanks for my services in promoting this great practical measure.

You are also pleased to say, that the advantages which the public interests will derive, when this measure is in full operation, will be mainly due to the meritorious labours of myself, my able co-adjutor, Dr. Martin, and the other Gentlemen whose names are affixed to the Report.

I venture to assure you on the part of Dr. Martin and those Gentlemen, that they will duly appreciate this expression of your approbation of the manner in which they fulfilled a very important duty, which they gratuitously undertook at the request of the Earl of Auckland, then Governour General, proceeding from the wise and benevolent interest he manifested upon all occasions to promote the prosperity and improve the civilization of India. I beg to say that it is impossible to over-estimate the value of the assistance I received from Dr. Martin and the other Gentlemen, Members of the Committee, in pursuing the investigation, the result of which was submitted to the Government, in our Report of the 7th of January 1840.

For myself, I can only say, that the personal advantages, I and my family have derived from our connexion with India, impose upon us, independently of the claims of general philanthropy, the bounden and at the same time pleasing duty of contributing all that our humble services can offer to the improvement of her social condition. The relaxation occasionally necessary to preserve the mind in vigour for the due discharge of functions which require thought, does not consist in an absence of employment, but in its diversity, and I have thought that I could not more usefully, or more agreeably employ the intervals permitted me from judicial duty, without I hope trenching upon its punctual discharge, than in attempting to suggest the means of removing the defects, in the sanatory and social condition of the Metropolis of India. Highly as I appreciate your distinguished approbation of my humble efforts to this end, I cannot but feel that it is expressed in terms greatly exceeding my deserts.

I sincerely rejoice that the measures necessary to accomplish the great end in view, are in the course of being brought into full operation. They will redound greatly to the honour of the Government of India, and though I shall not witness the success of this great public measure, I shall hear of it with great interest and with the utmost satisfaction in my retirement.

CHAMBERS, SUPREME COURT HOUSE:
11th November, 1846.

I have the honour to be,
Honourable Sirs,
Your most faithful humble Servant,
(Signed) J. P. GRANT.

(True Copies.)
J. MORRIS,
Clerk to the Municipal Committee.

No. I

No. 884,

To F. P. STRONG ESQ. &c. &c.

SIR,

Agreeably with the 3rd Resolution passed by the Committee upon the Fever Hospital and Municipal Improvements, on Thursday the 15th instant, I have the honor to transmit the enclosed Questions relative to the Suburb of Entally and the Salt Water Lake, and to request the favour of your Answers to them at your earliest convenience.

I have the honor to be,
Sir,
Your most obedient and humble servant,
(Signed) J. MORRIS,
Clerk to the Committee.

MUNICIPAL OFFICE,
TOWN HALL.
the 16*th April*, 1841.

No. I. *a.*

Queries (commencing with the 5th Query, of the Queries put to W. C. BLAQUIERE, ESQ. Magistrate, Calcutta Police,) to which Answers are requested by the Committee upon the Fever Hospital and Municipal Improvements, from F. PEMBLE STRONG, ESQ, Surgeon to 24-Purgunnahs, &c.

Q. 5. Which do you consider the most healthy locality, Calcutta or Entally?

Q. 6. On what reasons do you found your opinion?

Q. 7. Is not Entally more liable to heavy fogs than Calcutta?

Q. 8. Will you favour me by saying which you deem the healthiest Season of the year at Entally?

Q. 9. Are the Inhabitants subject to any particular class of disease, and what?

Q. 10. Have you any recollection of epidemics, and of what nature, visiting Entally?

Q. 11. Have you had any opportunities of becoming acquainted from report or otherwise, with the effects of the accumulation of filth and silt in the Entally Canal, upon the health of the Inhabitants on its Banks, or on the Suburb of Entally in general, and if so be pleased to state what, according to your information and observation, these effects were?

Q. 12. Have you had occasion to observe the state of health and appearance in point of health, of the Inhabitants of the borders, or any habitable parts of the Marsh called the Salt Water Lake, or generally to the Windward of such habitations, and the depth of the water, or if deep enough to cover the whole ground or otherwise, and how these spots are affected by the flux and reflux of the tide?

Q. 13. How is Entally supplied with Water, and do you consider the Water to be of good quality or otherwise?

Q. 14. Are the Tanks quite clean, and free from green scum and vegetation?

Q. 15. Can you state whether the Water drank by the Native Inhabitants, and poorer Christians, undergoes any filtering or other preparation, before being drank?

Q. 16. Have you noted any circumstances affecting the climate of Entally in regard to Electricity?

Q. 17. Any in regard to putrefactive fermentation from decayed vegetation, or from Malaria?

Q. 18. Will you oblige me by saying whether you have any idea of the amount of the population of Entally, or of the ratio of deaths to births, or can you give me even an approximate idea of the monthly or annual per centage of mortality?

Q. 19. Are there any Mussulman families at Entally, if so what may be their average number?

Q. 20. Where do the Mahomedans of Entally bury their dead?

Q. 21. Are you aware of any facts referable to the vicinity of public Cemeteries in Entally, or elsewere near Calcutta, as a source of disease?

Q. 22. Where do the poorer Christians of Entally bury their dead?

Q. 23. How is Entally off in regard to Drainage and Conservancy?

Q. 24. What effect do you think would the Draining of the Salt Water Lake or Marsh, have upon the climate of Entally?

Q. 25. Do you recollect any period during your residence in the Suburb of Entally at which the healthiness of that locality underwent any material change. At what period did such change occur?

What was the state of the healthiness of the locality previous to that period? For how long had you an opportunity of observing it?

What has been the state of its healthiness since, and to what cause do you attribute that change?

What are your reasons for coming to the conclusion you have now arrived at?

No. II.

Answers by F. Pemble Strong, Esq. to the foregoing Queries—8th June 1841.

***Answer* 5. Calcutta I am of opinion is more healthy than Entally, though Calcutta possesses in itself many causes of unhealthiness, which are noticed, as are also the causes of the unhealthiness of the Suburbs, in the Extracts (marked A. and A. 1. to A. 15. inclusive) of my Papers on the Topography of Calcutta and its Suburbs, which I beg to annex.**

A. 6. Because further removed from the vicinity of the Lake and kept in an infinitely clearer and cleaner condition than Entally, where less fire, heat, and smoke exist, both to prevent the formation of Malaria and to check its power when it invades the City. It is a general opinion, though not formed on any statistical data, that those parts of Calcutta nearest the River, are more healthy than those parts near Entally, and as you approach Entally unhealthiness increases, and it has been remarked that persons going from Calcutta to Entally have often been taken ill.

Of what may be done by Cleaning, Draining, &c. as an example, I would mention Cornwallis Square, now remarkably clean and healthy, a place described by the late Bishop Heber, as having been dreadfully unhealthy—a School and some Missionaries were formerly located in this part of Simlah. I have been many years ago called upon professionally to attend there when they were in the midst of a filthy jungle. The splendid Square and Tank and Mrs. Wilson's School began the Improvements, then the large Scotch Assembly School and the erection of a Native gentleman's mansion, and lastly the Church and Clergyman's House finishes the Improvements—it is now healthy. Baboo Kosseepersaud Ghose and his family when in their old house were extremely unhealthy, since his removal to this place he has enjoyed excellent health.

A. 7. I cannot say from experience.

A. 8. There is a general impression that the Cold Season is healthy—but from a Table of Ten years I have procured of the City mortality, November and December shew the greatest mortality, but I annex general Abstract Tables,—(see Papers marked A. 13. to A. 15. inclusive) one of which shews the mortality in all the months, and I see no reason to suppose the Suburbs differ materially in this respect: the average yearly mortality in Calcutta for these Ten years is *4.64 per cent—of these cholera is found to be among Mahomedans, 0.72 per cent,

Among Hindoos,	1.31	pr. ct.
Small pox, Mahomedans,	0.119	pr. mille.
Small pox, Hindoos,	0.228	ditto.
Various diseases, Mahomedans,	1.73	pr. ct.
Various diseases, Hindoos,	3.80	ditto.

and I find by a comparison among the Prisoners at Allipore and in the 24-Purgunnahs for 20 years a similar result as regards the November and December months.

* It will be seen by reference to my Table of Mortality, which extends to 23 years, for the different classes of Inhabitants of Calcutta that the general per centage of mortality is 4.54—*Sd.* F. P. S.

A. 9. Yes,—Fevers, Dysenteries and Spleen, are among the most common diseases.

A. 10. Yes,—I have known Measles, Cholera, and Small-pox, as Epidemics in Entally in different years.

A. 11. My opinion will be found in the last paragraph of the Paper marked A. 3, and in the first paragraph of the Paper marked A. 4.

A. 12. I have,—the Villagers on the borders of the Lake are great sufferers from Fevers, Continued and Intermittent, Dysentry, Spleen disease, Dropsy, and disease of the Alimentary glands, and their appearance is generally, as I have remarked in Paper A. 2. Para. 9, squalid and unhealthy; see also my observations at Para. 5 of the Paper marked A. The depth of the Lake may be said to be about knee-deep, or from one to one foot and a half deep. I believe that at every reflux of the tide a very great portion of the Lake is left exposed to the sun by day and the action of heat and damp at night.

A. 13. From a very few Tanks and Pools,- -the latter are numerous, small, and dirty.

and most of them dry during the hot season. See my observations on this subject in paragraphs 1 and 2, of the Paper marked A. 1, and the last paragraph but one of the Paper marked A. 4.

A. 14. Answered above.

A. 15. The Natives generally, I believe, adopt no mode of filtering; the poorer class have no time or means, but use the water as it is daily brought from the nearest receptacle; a few of the superior Class adopt some mode of purifying the water, which they purchase from Musulmán and Hindoo water-carriers, but at a dearer price than it is sold within the Maharatta Ditch, and the Hindoos pay nearly double to the Bharrywallas, than the Musulmáns to the Bhistees

A. 16. No.

A. 17. Yes,—see my remarks in Para. 4 of the Paper marked A. 5.

A. 18. I have attempted, but cannot ascertain the population of Entally itself. I annex a Census of the Suburbs, see Paper marked A. 12. I have no means of knowing at present the proportion of Deaths to Births, or the monthly or annual per centage of mortality in Entally.

A. 19. It is supposed that the proportion of Mahomedans to Hindoos is as one to two.

A. 20. At a Burying-ground at Tangra, Teelzilla, Manicktollah, Kassiabagan, Gobra, Kurbulla; on the road South-east to the Koolya Bridge is the Chinese Burying-ground, and towards the Eastern end of the Balliaghat Road there is a Parsee Burying-ground, and on the same road there is one for the Jews; but as regards the Mahomedans, if their relations reside within 15 or 20 coss of the City, they will often take them to their family vaults.

A. 21. The Mahomedan Burying-ground at Kassiabagan is I know considered unhealthy, from its low situation, and extremely bad Drainage; but perhaps if the above-named evils were removed, its situation as a place of burial, might not be objectionable.

A. 22. There is a Roman Catholic Burying-ground in Sealdah on the Circular Road, one in North Road, Entally, and the new Protestant Burying-ground on the Circular Road, near the head of Park Street.

A. 23. Badly Drained from the great want of Convicts. When I was first appointed Surgeon to the Suburbs and 24 Purgunnahs in 1820, there were plenty of convicts condemned for 14 years and upwards and sent from the Upper Provinces to Allipoor to work on the Suburbs Roads with our prisoners of the 24 Purgunnahs. The Entally Suburb was then kept clean, and many people took their evening drive on those Roads. One gang was stationed at Barnaghur, one in Sealdah, and one at Balliagunge, besides the one now in Entally, and there was one also at Bhowanipore; of these the Entally gang only remains, and from this guard a few Prisoners are sent to Barnaghur. There is a gang of prisoners at Kidderpore, and another over the water at Howrah. I firmly believe that the Entally Suburb can be kept clean and well Drained, for I have known it, as I have said, to have been kept so, and that for a considerable time. I am however of opinion that unless a Regulation is passed, making it imperative on individuals to keep their Grounds in

a Cleanly and Healthy state by Clearing, Cleaning, Levelling, and Draining, that all the efforts of even the best directed Conservancy will avail but little to remove the many causes of disease now daily accumulating. See Paper marked A. 1. para. 1, and 2; and the state of the Grounds, described in paragraph 5, of the same Paper, equally applies to the Entally Suburb.

A. 24. If I would understand the Question as referring to the operation of Draining the Lake, I have no hesitation in giving it as my opinion, after much consideration, that the Draining or the filling up with Silt, or Warping it, would not have an injurious effect either on the Suburbs, or City. Had I thought so, I would not have recommended the measure as far back as 1828. See para. 6, of the Paper marked A 1, and note at foot of para. 4, A. 3, in which I suggest Draining and Warping. I am aware that in some Climates such an operation might be attended with danger; but here, where the Sun is all powerful, I conceive any Malaria formed under such circumstances, would be rapidly dissipated by its pervading heat. The illness produced by Drainage near Chartrese, in France, is, I humbly submit, no guide to us in this Climate, for we find in more moderate Climates than this, that the Marshes made for Rice cultivation are much more injurious than Rice Marshes here. In giving the above opinion, I would be understood, that the Land once Drained shall not be again flooded, as it now is, by every alternate tide. I however am of opinion that Warping the Lake would be the most advisable.

With respect to the effect that would be produced on the healthiness of the neighbourhood after all the operation in the Draining or Warping is over, there can be but one opinion, and that is, that it would most decidedly produce healthiness.—See my observations on that point in my concluding paragraph of Paper A. 1.

A. 25. I have already remarked, that 20 years ago, and for some time afterwards, the Suburb of Entally was kept in a cleanly state; and from inquiries I have at various times made of Native doctors and others, the place was then more healthy than it has been of late years. I have officially reported to the Sudder Nizamut Adawlut upon increasing Suburb unhealthiness, and I brought the bad state of the Entally Suburb particularly to the Court's notice in the middle of the year 1828, I find in the year 1830 that I twice again remarked in my returns to the Sudder Court upon the unhealthiness throughout the Suburbs, and in this year I brought the same to the notice of the Medical Board. In 1833-4, I recollect that Entally as well as the other Suburbs were particularly unhealthy, and in the latter year the Magistrate recommended Government, at my suggestion to establish an Hospital and Dispensary at Kidderpore, that place being remarkably unhealthy. At this time I again officially brought to the notice of the Medical Board the extreme unhealthiness of the Suburbs, and in a letter to the Board, again in 1835, I repeated my sentiments upon the same subject. My impression is, that since the Inundations there has been a uniform unhealthiness throughout the Suburbs, I do not mean from any continued effect of the Inundations up to this time, but from the want of Prisoners or Workmen. If the former custom of sending Up-country Zillah Prisoners, convicted for fourteen years to work in the Suburbs of Calcutta, were again adopted, I believe these localities may be brought into their former cleanly state, although this would not effect all that is urgently necessary for perfect healthiness. See my Answer to Query No. 23. I have already enumerated what I consider the cause of unhealthiness, and my reason for thinking so, see Paper marked A. 5. paragraph 4, and Paper marked A. 7. paragraph 4, and following paragraphs.

I am inclined to think, in Rome and many other malarial countries, where the Thermometer does not rise so high as in Bengal, that the climate is influenced greatly by the

Character of the Soil which perhaps remains *more permanently moist* than it does in Bengal, which is a sandy soil, and allows the water to pass quickly downward ; the subject is admitted to be full of difficulty, and the opinions of the best authors conflicting. It is not possible to analize Malaria, to say at what point of heat, with moisture and assisting vegetation it begins, or at what exact point it is dissipated by the Sun's rays or other heat; perhaps the heat of a pipe or cheroot, or the warmth of the human breath, within gauze, may often prevent its action on the human subject. In the Mediterranean fires made where the sailors were procuring wood, prevented its action, where, previous to the adoption of the fires, it produced disease—but Dr. Macculloch, who tells us this, says distinctly, that Water does not check its progress, and gives proof by noticing a ship, three miles out at sea, having its crew affected by a Land wind ; and he believes that wind conveys Malaria from the coast of Holland to England. Great changes in healthiness have taken place in Calcutta since my residence here, although the Thermometer has not been changed as regards heat, it is therefore fair to conclude that Improvements have been the cause. We now rarely meet with the virulent jungle fevers formerly so common. In following up these Improvements more extensively, a still greater degree of healthiness may be expected— for it is not heat alone, or damp alone, that produces Malaria, but a union of these at a time while decomposition is going on in certain matters.—Cleanliness, Airiness, Leveling, and Draining, then, are the Preventive measures to effect the desired Improvements.

F. PEMBLE STRONG
Surgeon to Mysore Princes and 24-Purgunnahs.

CALCUTTA,
8th June, 1841.

No II. *a*

Extracts—Papers on the Topography of Calcutta and its Suburbs, by F. Pemble Strong, Esq. Surgeon to 24-Purgunnahs, &c.

Letter, dated 29th August 1837, from F. P. Strong, Esq. to T. Smith, Esq. Superintending Surgeon, Presidency Division.

A.

SIR,

In answer to your Circular of July 29th, forwarding for my perusal a Letter from the Secretary to the Medical Board to your address, expressing the desire of the Board to afford every practicable assistance to such gentlemen as may be engaged in drawing up Topographical accounts of Stations in your division ; I have the honor to forward copies of several Papers, written some years ago, upon this City, its Suburbs, the Salt Marshes, and the Soondurbuns, South-east to the Sea ; and to which I have added notes in the Margin in further elucidation. I also have annexed other papers more lately written, bearing upon the same subject, and a letter to Lord William Bentinck written by a Committee which was formed of gentlemen in the Suburbs, in consequence of my first communication upon the subject in 1828. A small map shewing the bearing of the different parts alluded to is appended, in which Mr. Tassin has, at my request, painted the Salt Lake of a bluish colour, and the low thick salt-water jangal, between the further end of the Lake and Tarda, green ; while he has represented the lands granted to various persons towards the end of the year 1829 and in 1830, in yellowish green colour; to shew their position, the line drawn with carmine points out the new Eastern Canal, the purple shews the old route by Tolly's Nullah, and the orange shews the route by Channel Creek. This is a map made only last year, and is not the map I allude to in my papers for further information. There is a large one of the Lake

and Calcutta by the late Captain Prinsep, giving the Levels also; and there are other larger Maps by Tassin, of Calcutta and the Soondurbuns, shewing all the individual Grantee's grounds, numbered, and pointing out the new Eastern Navigation, projected, and partly carried into execution, by the late Major Schalch, in a more particular manner than this small Map will admit of. One of the Letters annexed, will shew that I was called upon by the late Governor General, Lord William Bentinck, to attend a Committee at the Government House upon the subject of Draining Calcutta, and the Drainage and Silting up of the Salt-Water Lake. The Committee was composed of fourteen gentlemen, and His Lordship alluded to his own experience in such matters having induced him to call this meeting, in order that it might be continued by his successor, and mentioned his communications with the Court of Directors, and their assent to his views in the affair of Draining the Lake. The Committee was to meet again, but His Lordship's illness prevented it, and the subject appears to have slept ever since, except that the public prints have occasionally thrown out the views of different writers interested both for, and against. His Lordship had his own Plan for Draining the Lake printed, together with that of the late Captain Prinsep, and his Questions to that gentleman and the Answers thereto. There were also some other Papers annexed to these, bearing upon the subject, all of which I gave to Sir John Grant, who has given them to Lord Auckland. They are interesting as connected with the subject of my Papers, and should I be able to obtain a copy from the Military Board, or elsewhere, I will send them to you. I would add, that, when I first waited upon the Governor General, no part of the Eastern Circular Canal had been commenced upon, not a hoe had been applied to the ground, nor had a tree been felled; and I then understood, that, although the whole ground had been purchased by Government for the entire line of the New Eastern Canal, from its entrance from the Bagh-bazar floodgates to the old Entally Canal which runs into the Lake, yet, that some obstruction, or difficulty, presented itself to this improvement being effected. Viewing this as the Nucleus of all Improvement with a view to effect a Healthiness in this City, I took with me a Map of Calcutta, with the projected Canal drawn out in pencil, the more clearly to point out what I conceived of the utmost importance, and I was gratified to find that His Lordship took the same view of it that I did, and acted upon it, though I was given to understand that he met with considerable opposition; it is now however finished, and has been so for some time; there is considerable traffic upon it, and the monthly tolls form a considerable item of profit, although the failure of the Mercantile Houses has materially deteriorated the value of the ground Government have to dispose of on each side of this Canal. It has six Suspension Bridges over it, and a pucka road on its western bank.

The First Paper marked 1828, may be considered entirely Topographical, and was written about the time that I addressed the Sudder Nizamut Audawlut upon the general unhealthiness of the Suburbs of Calcutta. I informed the Governor General that I had made such a report in my Official Correspondence with that Court—and I found afterwards that my remarks were recommended to the attention of the Governor General in Council. This led to a Communication with the Magistrate of the Suburbs and 24-Pergunnahs, then one District, bringing my report to his notice, and desiring his attention upon the subject; he immediately put himself in communication with the Entally Committee, and sometime afterwards Mr. John Master, the Magistrate, shewed me a Plan of his own, for the Improvement of the Suburbs, and the Sites were marked upon his Map of the 24-Pergunnahs where he proposed to have Large Tanks excavated, and Roads made. Besides this, the Entally Committee had several interviews with Lord William Bentinck, and gave into His Lordship's hands their Plans of Improvement, of which the Letter I have alluded to, and annexed, forms only a part; they also gave in Maps of the Jungles, Roads, and Grounds

generally, and the then price of the Land, &c.; Sites for Tanks were I know fixed upon, and marked; but His Lordship went up the country, and nothing has been done.

The Second Paper was written some months afterwards, and may be considered as departing, in a small degree, from strict Topography, since I have intermixed the subject of Soils, and of Boring for Water, Agriculture, &c. but as regards the proper formation of Tanks, the Draining off of Water, and Wells, perhaps these subjects may be considered admissible as regarding Public Health. The New Canal had been begun, and was rapidly going on, and that work threw some light upon the general nature of the soil, and confirmed the opinion given by Sir Hyde East, that the dampness of the climate was not to be attributed to the moist nature of the soil, which was thought by some to be full of springs; and it also confirmed his opinion of an ancient Forest having in former times existed much below the present surface of the earth, which however may have been forced by torrents to their present position, as numerous and large trees were every where met with—many of them in an erect position.* Such was also found to be the case in the New Canal made by Major Schalch, running Eastward from the other end of the Lake at Bamonghotta to Hoosinabad; some of the wood had arrived almost at the state they call lignite. Most other parts of this paper are essentially Topographical, and point particularly to facts, and to unhealthy localities, and although towards the end of the paper, I have advocated particularly the growth of Cotton in the Soondurbuns, as well as Coffee and Sugar, I do not like to separate or divide the paper, for I advise the measure as a main means of reducing the Jungle and Forest, and consequently of reducing Malaria. And if my Third Paper should be thought to give a long detail regarding Boring, it yet shews the exertions that were necessary on my part to keep the experiment going; and we have now attained a depth of upwards of 400 feet, well tubed with cast iron, and the operation is going on with spirit. My further remarks advocating the cutting down the Soondurbun Jungles will, I hope, though a little lengthy, be pardoned, as tending to produce a more healthy state than at present exists. I fancy myself further borne out in not selecting parts only of these Papers, or altering their original diction, from the "Sketch" of a Plan for Memoirs on Medical Topography sent round with the Circular by the Medical Board to guide us in some degree. I there see Seas, Rivers, Lakes, Wells, Morasses, Bogs, and Canals, noted as points on which the Topographer should bestow considerable attention, as they so materially affect the dryness or moisture of a Country. The Deposits, animal, vegetable, and mineral, are also mentioned, and among several other matters which I had touched upon, I find Evaporation of surface, and Vegetable Products mentioned, and an allusion to the comparative healthiness of the Villages in the *Netherlands*, as ascertainable by the inspection of their Wells; and the state of Agriculture, and Population, being also mentioned, makes me hope that I shall not be blamed for not leaving out what I have said of Baron Humboldt, and also of the Campine of Brabant in the *Netherlands*, and the Abbé Man's remarks *upon the same;* and I need not apologize for what I have stated from Macculloch's work on the prevalence of Epizotic diseases appearing among Cattle, at the noted Seasons of Epidemic Fever among men, because I find in the "Sketch" circu-

* The Superintendent, a very intelligent Native, informs me that in the Canal beyond the Lake the trees were many of them very large, and were found in the greatest number about 30 miles beyond the Lake near Hoosinabad; many were very rotten, the rest were used for burning. Among them he recognized the Soondry, the Byen, the Gouah, and other forest trees; their trunks were of all sizes, and he supposes that along a line of 30 miles they were in number from 5 to 15 in a mile. As to the depth of such trees, those I saw in the nearer Circular Canal had their roots about or somewhat below the bottom of the Canal; and I saw a large tree, about the same depth, in a Tank digging on the borders of the Lake: the workmen said this was a Jack tree. —Aug. 29, 1837.

lated by the Board, that, that is a subject that should be inquired into by the Topographer. Indeed, I should have found a difficulty in making any alterations in my Papers.

It will be seen in the accompanying Papers, I have alluded to Mr. Martin's paper on the Medical Topography of Calcutta and its Suburbs, but there is one part of it which I have omitted to refer to, but which, as *Surgeon to the Suburbs* and 24-Pergunnahs, I ought perhaps to notice. Mr. Martin suggests that the Police Surgeon should report upon the state of Habitations, Sewers, Streets, Roads, Tanks, &c. and that he "*should also report minutely on the state of the Suburbs.*" The late Dr. Vos, the then Police Surgeon, in whose opinion as to the necessity of Improvement in the Suburbs I fully concur, was accordingly called upon by Mr. Martin for his sentiments. Mr. Martin was not I believe, aware, that my duties as Surgeon to the Suburbs, had not only brought to my attention the importance of the subject, but had induced me, at an earlier period than the Date of his Papers, to make the repeated Reports detailed in the accompanying Papers. I merely allude to this, as any person reading only Mr. Martin's Papers, might be led to infer, from the suggestion to extend the duties of the Police Surgeon to the Suburbs, that the Surgeon of the Suburbs had omitted all notice of the obvious causes affecting the health of that portion of the District under his charge, whilst in reality it has not been for want of representation of their bad effects, that the various causes of unhealthiness in the Suburbs have been allowed to exist in their full vigour, and until as I am glad to observe, they have at last attracted the notice of other medical officers, besides myself. Finding that the printed Papers advocating the Fever-Hospital, &c. were in circulation, I forwarded to the Government the three first of the accompanying Papers, and that upon the effect of the Inundations, and I received from Mr. Mangles an answer, that my opinions would not be overlooked when the matters to which they relate came under the consideration of Government. I annex a copy of the Correspondence for your information.

The Fourth Paper, which I admit to be rather rambling and irregular in its character, was written, as far as I can recollect, in 1830, at the request of the late Captain Herbert; and is in continuation of some Papers I had already given him upon the same subject, but which had relation more particularly to the City and Native Town of Calcutta, also including the Lake and Soondurbuns; but Captain Herbert required further information respecting the Suburbs; the *filthy* state of them he thought was the more immediate cause of sickness here. He said he considered that in these parts there was not sufficient space to breathe, without inhaling disease, and that the luxurious growth of vegetation every where existing among the Huts and Villages, produced the Malarious atmosphere, which not only influenced the Suburbs, but extended its effects to the City. He intended to have published his opinions in his "Gleanings in Science," as remarks on the Malarial Topography of Calcutta and its neighbourhood. Indeed he had begun this Paper, and had considerably advanced in it, when his departure from the Presidency caused him to transfer the work to other hands, and he then gave up his Paper upon Malaria.

This Paper or Memorandum is copied from a rough paper intended simply as a skeleton for Capt. Herbert to build upon; loosely written as it is, it may not be irrelevant to the subject of Topography, as it contains some allusion to facts, which may not be altogether useless.

All the above Papers were written seven or eight years ago, but the next paper, or letter, which, although long, is a question altogether about Climate, was for the information of the Commissioner of the Districts contiguous to Calcutta; and in answer to an inquiry issued on the part of Government, endeavouring, if possible, to select the more healthy from the unhealthy Districts, with a view to send Prisoners who are banished, to those Districts that are found to be the most healthy. It will be seen in this letter, that

I enter upon the subject with as much care and attention as I can command; the subject was a difficult one, and it was an answer to a Circular which was addressed to all the other Civil Surgeons as well as to the Magistrates; and the Commissioner informs me that my letter was the only one of all those he received, that he had forwarded to the Superior Court, the Sudder Nizamut Audawlut; and he said he did so, because he thought it contained a good deal of useful information; such being the case, I hope I shall be pardoned for forwarding it to you on this occasion.

Perhaps the health of Prisoners in a District may not be altogether a very bad criterion of the healthiness, or otherwise of a District. The question had reference to banished Prisoners; and those in the Allipore Jail being all banished Prisoners, and for life also, induced me to make a comparison of the mortality among them for a series of years. I found the average mortality little more than 5 per cent. which, considering that every man must die there, the proportion did not appear great. In Cities and other places, and departments, as in the Army with a regiment, or in other Services, men retire, become pensioned or otherwise quitting, leave the field for others, and do not remain to swell the mortality; but in this Jail, where men, many of them coming in advanced in age, are located for life, a larger mortality ought to be expected than among other bodies. I therefore come to the conclusion that it is healthily situated, and it will not appear inconsistent with my opinions, expressed in the former letter, as to the general causes of unhealthiness, because those causes are obviated in this particular case. The Jail is in an open space, clear of jungle, and these Prisoners are free to breathe good pure air in the absence of all jungle, filth, bad water, and other nuisances of which I complain, as affecting the Suburbs generally. The air is clear, and the Jail Tank probably the best of any, either in or near Calcutta; and I think it is an instance which goes to prove the correctness of the opinion of those who see sickness and death produced by Malaria where it is allowed to exist; as for instance, in the character of the disease and death which I allude to in the margin of my Second paper, in the case of Prince Sooroodeen, who allowed jungle to grow up to his very doors at Russapaglah, and whose continuance of life for several years was a source of surprise to myself. It may be that the quantity of Opium he took may, for a time, have counteracted the poison of Malaria which killed his only two sons when infants, and spread disease among his domestics. The Mr. Ward I allude to in the margin of the Memorandum for Captain Herbert, is another strong instance I would add in proof, and in addition to the facts and localities I point out in my earlier papers, I am sorry now to add another case to swell the list of mortality arising from the same cause. In all other respects, a most intelligent Native Doctor, who had been in my service for nearly twenty years, could not be made to understand that his continuance in his Family House at Bhowanipore, surrounded by Malaria, would be the death of him. I often so assured him, and took the greatest pains for a year or two, but all without effect; an old Jungle Piggery, inhabited by Chumars and Pigs, was the place of his residence, and his Diseases were first intermittent and remittent fever, dysentery, spleen, and he died dropsical.

The Allipore Jail I consider to be situated in the healthiest part of the Suburbs, and the whole of Allipore being, perhaps, somewhat higher, and better drained, or from the nature of its soil, which is sandy, does appear to me to have advantages over all the other Suburbs, if perhaps the open and airy part of Balleegunge be excepted. If I am rightly informed, the Inundations of 1833, which produced sickness in every house in Garden Reach, had not any serious effects either in the open parts of Balleegunge, or Allipore, while all the Inhabitants of the rest of the Suburbs were considerable sufferers, and great mortality was produced among the Native population of those parts.

The consequences of this flooding was felt even in the City, for by the Police reports the mortality in 1833 nearly doubled that of the preceding year, no doubt increased by

the vast number of the 24-Pergunnahs sufferers, both rich and poor. flocking into the City, turned out of their habitations by the floods, and arriving also for medical aid, as I have remarked in my paper upon the subject, written just after the Inundation. The soil of Balleegunge I have found by the borings I have made there, to be very sandy, (indeed the place takes its name from *bálú*, or sand,) which is highly calculated to carry off, or absorb superfluous water; and I would here remark, that the Lands to the South-east, as far as Gurriah-haut, and very far beyond that place, are an open Plain, and are generally, with the exception of Garden cultivation, cultivated with Rice or Tobacco, to the extent of many miles, say twenty; and it is only here and there that Villages are to be seen, and these at a great distance from each other. It appears to me, and I wish to press it upon the minds of those who consider this subject, that the Malaria Calcutta has to complain of, is very greatly, although not entirely, in the surrounding crowded Villages, and more particularly those to the Eastward, between the Salt Lake and the Mahratta Ditch;—for, admitting, what now seems to be uncontradicted, that this Lake is highly productive of Malaria, the *Air* when the wind is Eastward of us, has to find its way to our City, only over Swamps, Jungles, and Villages—themselves highly productive of the same Malaria, and therefore not calculated to dispel the evil. The advantage enjoyed by Calcutta when the wind is South, is, that it passes over a large tract of country with very few villages; besides which there is the fine Maidán South of the City, to neutralize what Malaria it possibly may contain: a similar remark may be said to apply in some degree when the wind is in the North;—and on the West, the River is some safeguard;—but the Eastern is notoriously the bad wind, and I think here it is sufficiently accounted for.

Should the researches, now making, tend to a better knowledge of these facts, some attempts at improvement may commence. Very slow and gradual Improvements have, no doubt, been adopted by the few Europeans and others of intelligence, who have at different periods inhabited our Eastern Suburbs, so much so, that among Europeans, life is much more safe than it was half a century ago, when we know, from well authenticated records, that the mortality was frightfully great; and we find the Salt Water Lake recorded as the most prominent of the causes. Should cleanliness ever obtain in these Eastern Suburbs, and the Salt Lake become Drained and Cultivated, I entertain no doubt whatever of great healthiness being the result; and one great advantage attending the Drainage of the Lake would be, that the country between it and the City would immediately improve, become more valuable, and be the resort of a more respectable population.

However Malaria may be generated, there can be no doubt that it is produced most abundantly in all those parts of Bengal, which are not cleared of Jungle, Drained, and kept Clean. Within my recollection the Maidán south of our City, was more swampy, and covered with a coarser grass than it now is, and many parts of the Native Town, and Chowringhee, are much improved, broad Roads and Squares having been made; and it is quite obvious, to me, that Fevers and Diseases in general are by no means so common as when I commenced practice here. I am so certain on this point, that I will not waste time by entering into particulars. Further Drainage and more free Circulation of air will still farther improve the Public Health; and it is admitted on all hands, that attention and improvement in our City Drains is indispensible to effect the good desired.

Yet, I think we must look to the Improvement of the surrounding Suburbs, and Lands beyond, effectually to render this City as healthy as it can be made; and without attempting to investigate the chemical analysis of Malaria, or to describe what medical treatment should be adopted for diseases produced by this poison, I will endeavour to draw attention and point to the numerous causes existing all around us.

Let us look around us, and we find all the essentials necessary for the formation

of Malaria ; beyond our City, Jungles, Lakes, Marshes, Gardens,—crowded with trees and woods of every description.—Weeds, stagnant Water, filthy Pools, and low grass jungle of every kind, surrounding the Villagers' habitations. In these exist ample means for a constant supply of the Poison, assisted, as they are, by the natural heat and moisture of the climate; but when unnatural or meteoric changes of climate take place, or when unnatural Inundations of Sea, or River water occur, then, as we should expect, we find Disease and Death scourge the land, as was instanced by the Inundation of 1833 in particular, and as shewn by all the other* Inundations also. Such excess of mortality is to be expected in Bengal when Inundations, or unusual moisture, followed by great heat, occur. As a common cause of the constant Malaria that prevails here, I would mention the *exposure of a vast expanse*† *of wet mud*‡ *on the receding of the tide from the Salt Water Lake*, and the banks of the numerous Rivers, and tide Harbours;—it would not be difficult to enumerate more causes, but the above are sufficient. Within the City, among numerous other causes, we find Sewers and Drains sadly neglected, allowing their decomposed and decomposing animal, vegetable, and other substances, to sink into the earth, instead of Draining off as they should do into the River or the Circular Canal. Here perhaps in some particular state of the ground, the soil may be of a nature calculated to receive the poison, and it probably condenses and accumulates, forming, as it were, a permanent attachment to the spot, and for what we know, certain peculiar solid bodies, casually exposed to it, may receive it also. Whether the poison be produced by common putrefaction, or by any peculiar change in the elements of vegetable matter, dead or dying, it seems to be admitted that we know not its exact chemical character, though it is acknowledged that it is produced and propagated by Wet soils, Hot countries, a particular State of Atmosphere and high temperature; and with this knowledge we do possess power to controul and check, to a very considerable degree, this extensive cause of mortality. We know by authentic records that it is but little more than a Century ago when London, from its then filthy state and bad drainage, was subject to very great mortality, and as civilization has advanced, the Countries as well as the Cities in Europe have also improved in Healthiness.

* Those of 1831, 1832, and 1834,

† The extent of the Lake is 18 Square Miles.

Dr. Bisset Hawkins describes in his work lately written on Medical Statistics, that

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‡ Dr. Macculloch remarks, " How far mere mud, the apparent product of the Sea, or left by the recess of the tide in Ports and Estuaries, and at the mouths, or on the banks of tide rivers, can or does produce Malaria, is one of the questions on the subject which has been argued on different sides. That such mud appertaining to fresh waters, and laid bare by the Summer heats, in Lakes, Pools, and Canals, does produce fevers, and of a very serious character, has been formerly shown. "

And again,

" Or as it is the effect of tides in Estuaries under similar circumstances to reject and often therefore to expose the mud brought down by Rivers, it is plain that even without the presence of marine plants or their remains, such mud must often be in the same circumstances as that of Lakes in Summer. "

As to the River banks in America, we have the authority of Volney, the accuracy of whose observations can seldom be questioned, that every River in that Country, whether rapid or stagnant, produces Malaria and Fevers.

In France we have the authority of Mons. Falcon as to the pernicious character of Canals in France; he enumerates them generally all through France as sources of Malaria. Indeed the opinion of a host of writers who have studied this subject, go to prove that the banks or margins of Rivers and Canals generally possess all the essential qualities of a marsh, as a diminution of the waters may *expose* mud *impregnated with vegetable matter*.

I have in these Papers given some instances of unhealthy localities from the above causes, and could, were it necessary, give more from personal observation and experience. That such confined spots, as muddy banks of Rivers and Estuaries, do not act far beyond their immediate limits, that they do not produce the same wide effects of disease as extensive marshy tracts, does not prove that they are not sources of Malaria.

17th September, 1837. *(Signed)* F. P. S.

mortality has diminished in nearly the same degree, in which the prosperity of these countries has gradually increased. In England and Wales, for instance, the annual deaths were, in the Census of 1780, so numerous as 1 in 40. In 1801 they were 1 in 47. So in France (a more Malarial country it might have been remarked) the annual mortality was, in the year 1781, 1 in 29, and in 1802, 1 in 30. In London he considers that now, 1 person in 40 dies annually; while he gives the mortality of England and Wales, at the present time 1 in 60; a considerable improvement since the year 1780, when it was 1 in 40.—Doctor Hawkins gives the Mortality of various Continental Cities, and compares them with the country mortality, which it exceeds in every instance. He remarks that Mortality, or the Calculation of the Number of Deaths which occur in a Country or Town, has become an important object of research; and that Tables are formed in almost every Civilized State by direction of the Government, in order to ascertain the point.

In some Districts this amount is increased, or diminished in a slight degree, by direct, and by local causes; but, on the whole, it appears that the good or bad condition of a people, the possession of the necessaries of life, or their absence, mildness, or rigour of the mode of Government, the advance or retrogression of knowledge, are the principal circumstances which influence the result. The greatest difference of Mortality in City and Country, appears in Holland, where in Amsterdam the deaths were 1 in 24, while in the country it was 1 in 48. In the City of Naples 1 in 28, in the Country 1 in 35. In the City of Paris 1 in 32, in France 1 in 40. I may be allowed to quote Dr. Hawkins' concluding reasoning upon this important subject: "Life and Death, then, mainly depend upon the *prosperity* of the circumstances which surround us: physical prosperity and moral happiness, which often depend, and re-act upon each other, present a safeguard at every crisis of existence, both to individuals and to nations. We may *often* judge with tolerable accuracy of the mortality which is likely to exist in any given Country, Town, or Hospital, from the degree in which poverty or wealth, knowledge or ignorance, misfortune or success, are seen to prevail; wherever want and *misery* exist, there the mother is more likely to die in labour; there still-births will be more frequent; there the deaths during infancy will be more numerous; there epidemics will rage more violently; there the recoveries from disease will be more tedious, and the fatal termination of it more probable; and there also will death usually approach at an earlier period of life than in happier situations." It will be seen in the Statistical Account of the British Empire, just published by J. R. Macculloch, Esq., under the head of "Vital Statistics," that between the years 1813 and 1830, he calculates the annual mortality in London at 2.84 per cent. and for six *Towns* in England for the same number of years as at 2.95, and he estimates the mortality at Glasgow between the years 1821 and 1835 at 2.83 per cent., whilst he gives a detail of Wales and forty Counties, shewing in every instance a considerable decrease of mortality as compared with London, Glasgow, and the six Towns above cited. The above mentioned book has numerous tables upon points of mortality, and contains other information upon the same subject of great interest.

With regard to this part of India, I mean to confine myself to Bengal. I think the reverse of what occurs in Europe as to mortality will be shewn, when we obtain Statistical Reports that can be relied upon; and whatever may be the healthiness, or otherwise, of the other Bengal Cities, I expect it will be found, that in Calcutta there is less mortality than elsewhere generally in Bengal, though it cannot be expected that we should shew so small a mortality as exists in the City of London, or the other European Cities.

In England and Wales the poor are taken care of in Workhouses, and the sick poor receive good medical and surgical advice and attendance in Hospital; but in India, where the knowledge of medicine, and the healing art is the same as it was many centuries ago; where in place of a sympathetic feeling for his fellow-man, there not only prevails an

apathy in the Indian character, but where a division of caste prevents the agency of good-will and assistance of one towards another; where insufficient clothing, bad food, bathing at improper times, and the practice of fasting for long periods, (adopted both by Musalmáns and Hindus,) and where the Hindu ceremony of Antarjalí, which is so general,—taking the sick to expedite their death upon the muddy bank of the Ganges—prevails; added to all this, the want of advance in civilization and knowledge, and taking into view the extensive sources of Malaria so much dwelt upon, the existence of which I conceive, must, in a great measure, proceed from the want of knowledge and advancement in intelligence above alluded to, we must naturally expect to find a greater mortality here than in Europe.

The housing and habits of the Bengális which I have attempted to describe in the 9th paragraph of my letter to the Medical Board, dated March 21st 1835, all seem to have a tendency to deteriorate and shorten life. The Diseases of Bengal are nearly all produced by Malaria, and bear a very strong analogy in character to the Diseases formerly prevailing in European Cities and Countries, in times more uncivilized than the present. Sydenham, speaking of those times, says, Cholera comes almost as constant at the close of Summer, and towards the beginning of Spring, as Cookows towards Midsummer. He closes an accurate description, by remarking, that it "often destroyed the patient in 24 hours." Dr. Craigie has demonstrated the antiquity and identity of Cholera all over the world. The description and remedy for Cholera, (taken from the work of Hermannas Vander Heyden, a physician of Ghent, dated 1653.) published in the 1st vol. of the *Gleanings in Science*, I myself sent to the author in 1829. The remedy, as far as the opium and *Henbane, Hyoscyamus*, or the *Khorásání ajwayán* is concerned, I can speak of myself most favourably, from extensive experience. The author remarks, that the taking of it (the remedy) is not to be deferred so long, as that the patient is fallen into convulsive fits, and his *excrements* are of the *colour of Whey, which are evident signs that nature is spent in him*, for then it must be taken with *all speed*, &c. Fevers, remittent, intermittent, and anomalous, with Cholera, Diarrhœa and Dysentery, Spleen, and all the Nervous disorders under the head of *Neuralgia*, are the prevailing diseases both among the rich as well as the poor Natives of this Country. We find the Baboo of both Calcutta and the Mufassal passing through a life of disease and misery, and dying early in life, somewhat similar to our European Barons of old, who are said seldom to have attained to an advanced age, the filthy moats surrounding their Castles being supposed to have been the main cause; so here, I have often had occasion to remark, in and about Houses of opulent Natives, causes sufficient for all the mischief alluded to.

In conclusion, I will add some Tables [See Papers marked A. 13. to A. 15. inclusive,] of the Census of Calcutta lately taken, with the mortality of the Natives for the last five years, taken from the Police Books. Captain Birch began this year to procure the Births, so that in future a more correct estimate may be formed. The great difference in mortality between the Hindus and Musalmáns is striking,—while the difference to be observed between the Portuguese as compared with the English and the Eurasians is equally so.

Here is much room for speculation, and it cannot be said that as yet we have as good means of getting correct information upon this subject as they possess in Europe; nevertheless, we may approach as near as we can to the point we wish to ascertain, and we may hope to improve in such Statistical Records. If we are at all near the truth, the result seems to agree with the opinions formed by Dr. Hawkins in his conclusions and summing up upon the subject, just above referred to, and quoted. The Portuguese, among whom so great a mortality is shewn, are a suffering race, greatly subject to the catalogue of complaints enumerated in these papers,—while the English and Eurasians are far more prosperous in life, and enjoy comforts and happiness in a very high degree, as compared with the former

section of society: the mortality of the latter is 3⅓ per cent per annum, while that of the former being 12½ per cent, is very great. In 1830, I ascertained and published in the "Gleanings in Science" the burials in Calcutta of Protestant Christians from the year 1820, to shew at that time, that although the European population must have greatly increased, yet that the deaths and burials had not increased; and now that the same population is acknowledged to have increased very materially indeed, yet we see, upon referring to the first column of one of the tables, giving the Protestant burials for the last 20 years, no increase of Deaths. The years 1833–4, the two years following the Sea Inundations, shew the greatest mortality of late years; while among the Native population those two years shew an extraordinary mortality. The two last years shew, that in both European and Native population healthiness is restored. The mortality among the other columns of Sections of Society, the Catholic, Greek, Armenians, Hindus, Armenians, and Native Christians, are for the last 20 years, and I believe them to be nearly correct. The Chinese and the Jews keep no account of their burials, I of course could not include them—and they form a small portion of Society in this City. The Census is the one last taken by Captain Birch, and he took great pains to make it as correct as possible. You will observe by one of the letters annexed, that, upon the receipt of your Circular, I addressed the Magistrate of the 24-Pergunnahs, requesting a Census of the Zillah, together with the Mortality; and you will see his obliging answer to the same: the Census I send is only of the Suburb Division, which forms only a part of the District.

I have, &c.

(*Signed*) F. P. STRONG,
Surgeon to 24-Pergunnahs.

August 29, 1837.

Appendix to the foregoing Letter.

I find I have omitted in the foregoing Letter to notice what has been done at different times in the Suburbs of Calcutta, when Cholera has been scourging those parts, and carrying off all its victims who could not obtain, or who declined, medical aid.

It is but justice to the Native Doctors who are permanently appointed to the different Gangs of Prisoners on the Suburban roads, as well as the Native Doctors attached to the Mysore Princes, that I should state how eminently successful they have been in saving Life under these dreadful circumstances, and this has been a work they have at such times performed, independent of their actual duties. I think I may say that, taking the average of several years, the mortality among Villagers has not been more than 6 per cent. of those attacked with Cholera, where the above mentioned Doctors, and others appointed temporarily to assist on urgent occasions, were called to the patient in the early stage of the disease; and the average of the last sixteen years gives a proportion of 6⅜ per cent. among the Prisoners attacked with Cholera at this Sudder Station. A like favorable result attended the Native Doctors appointed at Bombay, when the Cholera became epidemic in that place, and Dr. Ogilvy, the then Secretary to the Medical Board of that Presidency, remarks that it was not ascertained that any case of cholera *had recovered* in which medicine had *not* been administered. 1204 fatal cases of Cholera were reported by the Bombay Police, in none of which cases had Medicine been given. Should this be the case in all situations among the poorer Natives of India when Cholera prevails, might it not be considered as a highly to be desired act of benevolence on the part of Government, that Native Doctors should be permanently fixed at different points? Say one, or two, with a supply of Medicine at each Thannah,

immediately to render assistance in case of any illness, whether fever, or otherwise, for although it is possible, that every case of Cholera reported as such, may possibly not be actual Cholera, yet it probably may be a formidable disease, and would be immediately relieved; while Fever, Dysentery, &c. would receive a check, and most cases of Cholera would be cured at once. The subject is an important one, and probably much better plans than those I have suggested may be put forward by others, and adopted by the Government. I would only here remark, that such remedial measures may be the means of preventing much serious disease, and to a certain extent, preclude the necessity of Native Hospitals. The Natives themselves seem to have a great objection to quitting their homes and mixing with different classes of their fellow-men.

It appears to me that, as a means of checking the progress of disease among the Natives of this country, some such plan would be found greatly to assist the grand preventive means, the subject of my Theme, the removal of Malaria.

In the Map of the 24-Pergunnahs, which I copied from the Map which Mr. John Masters lent me several years ago, will be seen the Roads and Tanks proposed by that gentleman to be made in the Eastern Suburbs marked in red ink, and it will be observed that this projected Improvement occupies at least half the ground between the Salt Water Lake and the Mahratta Ditch. The Improvements recommended by the Entally Committee were more extensive.

A. 1.

On the Topography of Calcutta, the Suburbs, and the Salt Water Lake, and Soondurbuns beyond.—1828.

In and about Calcutta among the causes of unhealthiness, are the number of small dirty Tanks, and the large Drains from which the Water does not run off; examples of these may be seen in every direction, but particularly along the Circular Road, the Boitakanah Road, and the Roads in and about Entally and Sealdah. To these may be added the numerous Holes or Tanks of Shallow water which fill in the Rains, and stagnate in the Dry weather. To remove these causes of Malaria, it would appear necessary that the Drains should be kept in a clear state, so that the water should run off at once; and as to the Holes or small Tanks they should be filled up.

On looking at the Map it will be seen, that there is a great deficiency of *Public large Tanks* all along the Circular Road,* and if Tanks of a considerable size were dug there, the

* As regards the deficiency of public Tanks, I am glad to be able to add the following as a Presentment of the Grand Jury to the Judge, signed by the Foreman, on behalf of himself and the other Jurors only the other day,

"That the Native Inhabitants of Calcutta are, during the Hot Season, most distressed for want of a proper supply of Water for Domestic purposes, and for the extinction of Fires; and that there ought to be at least *Six new Tanks of water* dug on the Calcutta side of the Circular Road, and the aqueduct from the Engine at the Chandpaul Ghaut ought to be carried to each of the said proposed Tanks, and also to the several public Tanks now being on the line of road from Sám Bazâr to Park Street, in order that the said several Tanks may be supplied with Water from the River, &c. &c. *August 25th* 1837."

soil from them might be used in filling up innumerable Holes and Tanks, and also many Ditches, which are perhaps of an unnecessary depth and width. A plan something like this, Dr. Martin tells me, was adopted near the Body Guard Lines and his Hospital,* with great good effect in lessening the number of sick sipáhís in Hospital. To these causes may be added the great quantity of Trees and Jungle to the Eastward of Calcutta, and indeed throughout the Suburbs, and even in many parts of Calcutta itself; much of this exists in the private Gardens and Compounds of individuals, and is, I imagine, as great a nuisance as it is in Towns in England to exercise any unwholesome trade to the detriment of the health of the Inhabitants; and as such nuisances can there be put down, so ought the nuisance of overgrown Jungle here to be capable of being removed. Much probably arises from neglect, and would be removed without any coercion; example might induce some to remove the nuisance, but there might be others, who might require a stronger stimulus than either example or their own benefit. To meet this, perhaps a Regulation, if necessary, might be framed by Government, which I should think would not be a matter of much difficulty as far as regards the Town, and for the Suburbs I should hope there would be no difficulty. In the Native part of the Town, the *stench* of the Drains and stagnation of the Tanks is a sad grievance. In these *filthy* stagnant small Tanks or Puddles, numerous Natives bathe; and in these you may see filth of every kind; and I can point to such which produce *sickness* and *death* to those who live close to them. The filling up of those

* Mr. Martin in a printed paper on the Medical Topography of Calcutta and its Suburbs in 1834, gives a further account of the Body-Guard Hospital, and Improvements the Government adopted at his suggestion. He says, the result during the three following years, was a reduction in the frequency and intensity of fever, as remarkable as it was satisfactory. In speaking of the different Villages he says, that one description will serve for all; viz. general irregularity of ground, affording lodgments of various extents for stagnant waters, now very offensive; Drainage every where defective, and good Tank-water scarce. There are also belts of Jungle trees and underwood, obstructing ventilation. In all these villages the replies of the Natives confirmed, what indeed any one could have predicted, as to the general prevalence of remittent and intermittent fevers; he adds, it may be said with truth, that of all the places noticed, there are not six square acres of soil occupied by Natives which do not contain marsh, and other concentrated sources of periodic fevers, which in the course of time establish their inevitable sequelæ of spleen, and fatal diarrhœa—the brief history of the life and death of two-thirds of all the poor Inhabitants around us.

I do most cordially agree in sentiment with Mr. Martin, that, without attention to the state of the Suburbs in the first instance, it is useless to attempt any great improvement within the City, and he considers that for one case of Fever within the City, there are two beyond the Maharatta Ditch. I allude to Mr. Martin's observations and sentiments on these subjects, as confirming those which I had previously expressed in my own papers on the same subjects; and I may add, that the late Doctor Vos in his letter to Mr. Martin's address, says—"The Suburbs require much Improvement, and as long as this object is unaccomplished Calcutta cannot be healthy, it being surrounded with Jungle on all sides except the River. The Suburbs of Calcutta are full of dirty pools, and no sufficiently large Tanks." And he alludes to the continual sickness in most families, except those who live in Upper-roomed houses.

With the same view, I also refer to the observations made by Bábu Ramcomul Sen and Dr. Jackson, to Mr. Martin's address, who remark that the particular causes of fever are:—

1st. Want of Tanks in different parts of the Native Town to supply wholesome water for drinking.

2nd. Accumulation of Filth and stagnant water.

3rd. Shallow Tanks, with Unwholesome water.

4th. Digging Pits and Holes, and leaving them open.

5th. Drains.

And it is further remarked—in the Suburbs of Calcutta the Drains are badly kept, water does not find its free passage in them, and amongst crowded gardens, full of marshy places surrounded by Jungle, the free circulation of air is prevented, while the decayed leaves and vegetable substances thrown into the stagnant water create Malaria, and produce Fever; and it is added, that few of the labourers, peasants, and poorer class of people living in the Suburbs, escape its effects; and even the higher class of people are attacked with it, and a large portion of them fall victims to it. *August 29th*, 1837.

Holes and making large Public Tanks would be of essential benefit as regards Cleanliness and Health.* Almost throughout the Native Town the Drains are generally of a bad kind, and as regards Drains, the Steam-engine,† now about to be erected at the Bágh-bazár, to water the central Chitpore road, might be made available to fill Reservoirs that might once a day, or probably twice, cleanse the Drains; or it might be desirable to erect more powerful Steam-engines for such purpose generally throughout the Presidency. The filth of every kind found in most of the cross and small roads in the Native Town is a great evil added to the rest, and if the Chokidárs, or those empowered, would oblige the Baboos, and those in large houses, to remove away their nuisance, it would be desirable—Regulation of 1814, enforces this.

The Tatties generally throughout the Native Town of Calcutta and Chowringhee, are much complained of in all directions; and situations of extreme nuisance on this account, are frequently pointed out to me. I have found in the Insane Hospital the advantage of sinking this nuisance into deep wells‡, but improvements of this sort, and of so extensive a nature, would rather belong to a scientific Surveyor than to a Medical man, whose province it may more immediately be to point out these various sources of pestiferous atmosphere, and the same remark equally applies to the general Draining of Calcutta.

It is not easy to point out what this Miasma or Malaria is, but the state of the soil has much to do with it; it is known to be formed in Marshy or Undrained spots, in Wet Woods, and in Moist Meadows; and the low and dense brushwood Jungle or thickets of reed or grass, so common in India, being the residence of moisture and decaying vegetation is analogous to Marsh land, and must produce much; but it is well known that Indian Fevers are caught also in Forests, such as the Turraic forest, and many others, but particularly in a most dangerous one near Hoosunabad, and one above Bareilly.

I conceive then, that putting out of question the Soondurbuns, and the *Salt Water Lake*, that the Thickets of trees and Jungle, Weeds, Pools, small Stagnant tanks, and Jheels, which every where abound on each side of the road, down from Chowringhee, Brejeetullah, to the end of Russapaglah, on each side of the Kalighat road on to Tolly's bridge, on each side of Tolly's Nullah, and the road on the right of this Nullah as far as the Insane Hospital, where the eye can hardly find any equality of surface except on the Jheels and Tanks, and where the wild Indigo and *noxious weeds* are growing in all directions—all this being situated South of the Presidency, must be a constant source of disease and disorders, many of which would vanish, if this pestilence could be removed. And if I am not mistaken, I can trace illness from this very source (these weeds, &c.) to certain houses in Chowringhee, where in occasionally uninhabited houses, in the compound, and round the Tanks is to be found Jungle indeed,—which must add greatly to the Malaria which is blown from the Russapaglah Jungles over the Chowringhee part of the Presidency. I have *as yet* excepted the *Salt Water Lake* and Soondurbuns, to confine myself to *Calcutta* and its *Suburbs;* but considering the general healthiness of this Presidency, they cannot be well excluded, and they have been always considered as conducing to the general unhealthiness of the place, the wind coming over such an expanse of *Jungle* and *marsh.* The experience of medical practitioners here confirm this opinion, for it will be generally found, that where Easterly winds prevail for some days together a greater degree

* One good-sized Tank has since been made in the Native Town. *August 29th,* 1837.

† A considerable sum was subscribed for this purpose, but the plan was not adopted, the interest the money being expended in watering the Chitpore road. *August* 1837.

‡ The same plan has since been adopted in the Jail Hospital at Allipore. *August* 1837.

of sickness is common. To inform myself, as well as I can, regarding the Lake, I have been through it as far as Tarda, and frequently visited its borders by the several roads leading up to it from the Circular Road; the further half of what appears in the Map as Lake, is now a continued low Soondurbun Jungle from Bamanghatta to Tarda, intersected by channels; and the same kind of thick low Jungle is continued round from Tarda to near the lands adjoining Gurria-haut, on Tolly's Nullah. From inquiries I have made I understand that the water in what is called the Lake, but which may more properly be considered as a mere shallow Marsh, is generally not much more than knee-deep, and it is in many places of even less than that depth. The appearance of grass and bushes growing in the water, shews that it cannot be of any considerable depth, and I am inclined to believe, that the depth of the water generally throughout the Lake, is, with the exception of the Navigable Channel through it, not of greater depth than what I have just mentioned. The water is brackish, but becomes more salt as you proceed from Balliaghat towards Bamanghatta, along the navigable channel which runs through the Lake to that place. No one can doubt that a shallow* brackish or Salt Marsh, extending, as the one in question does, over a surface of many miles,† must be a source of much unhealthiness, particularly in a tropical climate; and that it must produce a contaminated atmosphere, the bad qualities of which must affect the health, not only of those inhabiting its immediate borders, but also those residing in the neighbourhood for miles around it. That the neighbourhood of the Lake is really unhealthy,‡ I believe needs no proof; inquiry amongst the Natives of Balliaghat and other places, similarly situated, would satisfy any person in this respect. He would be told, "the air was very bad," that "the *Salt* air was very bad," and would find, that sickness in those places more than commonly prevails.

I have heard it said, that this Lake or Marsh was capable of being Drained, and the lands redeemed and brought into cultivation; moreover, that it would probably become valuable land for the cultivation of Indigo, Rice, and other products. The question of Draining, however, is one which belongs more to the province of a Surveyor to decide, and upon which I am unable to form any correct opinion. The Channel which runs through the Lake from Balliaghat to Bamanghatta, is bordered on each side with grass and Jungle, and is the only part of the Lake which I understand is used for the purpose of Navigation, and this Channel is obliged to be kept open by means of Dredging Boats. On the borders of it, and indeed on other parts of the Lake, huts are occasionally to be seen, and Cattle grazing in the Jungle and grass in the water; here and there are to be met with lumps of earth above the water, and particularly *small ridges in some places along the edge of the Navigable Channel.* From these circumstances, and from what I have heard on the subject of Draining the Lake, I am rather inclined to think that something might be practicable in this respect, and I believe there are as yet no grounds for supposing it impossible to Drain off the water; or by Embankments, or some other means, to reduce the land, now waste and useless, and a source of disease, into profitable cultivation, and make it at least a comparatively healthy place. I believe that some land bordering upon the Lake, on the Calcutta side, and to a considerable extent,

* Marshes into which Sea-water occasionally enters, are observed to be more Pestilential than mere Fresh-water Swamps. Vide Dr. Traill's Medical Jurisprudence, page 88.—*August*, 1837.

† Eighteen and a half square miles.

‡ Some years ago 16 Police peons were sent upon a particular duty to the borders of this Lake—every one of them became ill; as many more men were sent in their room; and these were all attacked with disease, and obliged to return.

My informant was Mr. Blaquiere, who saw these men. It has been said that if the Lake was converted into a rice cultivation, it would be as unhealthy as it now is. Quere. Would a double batch of men sent to a rice cultivation become thus diseased?

has already, by means of Drains and Embankments been reduced from its marshy state, and either is, or will shortly be, in a state of cultivation; which is a proof, that industry may overcome any seeming difficulties; and that at least some parts of this Pestilential Marsh may be brought into a valuable state; and if the whole, or a considerable part was reduced into cultivation, even into Paddy or Rice lands, the situation would become much more healthy, and the whole neighbourhood, including Calcutta, would be much benefited by it. It is true, that as Paddy or Rice land it would still, at certain Seasons, be partially under water, as lands of that description generally are; but I do not think that such lands produce the *same unhealthy atmosphere as the present Salt and Jungle Marsh**

* *Annesley* on Soils and Situations productive of Miasmata, &c.

Page 55.—The copious extrication of unwholesome effluvia from *Salt Marshes* and partial Inundation of the Sea has been long admitted, and has only been disputed by one writer of eminence, who instances, in disproof of the position, the Salt Marshes of one particular District in the Western Hemisphere; but there it is probable that there was some peculiarity in the soil and its productions, which rendered the formation of Malaria impossible.

Page 56.—Experience will prove, &c. &c. when such Soils have been Inundated by the *Sea*, as from the breaking down of Embankments, &c. the formation of deleterious effluvia has become most abundant, and has been the source of a most devastating pestilence. In proof of this, we may mention the noxious situations and *Salt Marshes* at the mouth of the *Ganges*, the *Irrawaddy*, and the *Indus*, and numerous other places in the East. In the North of Holland the fever which was so destructive in 1826, was a very strong proof of the deleterious effect of *Salt Water*.(1)

Page 57.—The effects resulting from the Inundation of the *Ocean* are not perhaps referible so much to the circumstance of a small quantity of Salt proving a septic, as is supposed by many; for it seems evident the antiseptic properties of Salt are in proportion to its quantity, and that a small portion will not have a septic tendency, because a large one has an opposite effect. The subject has not received its desired attention, and authors have, in respect to it, been more prone to copy the suppositions and admissions of their predecessors than to examine into the grounds upon which the opinion is founded. *That Sea-water, mixed with Fresh water and vegetable matter in a state of decay, will increase the generation of effluvia* under the influence of a powerful *Sun*, and render them more concentrated, SEEMS TO BE THE FACT. It has been *repeatedly* presented to *our notice*, and is supported by the *testimony of the majority of observers*. But this result seems to be owing to the quantity of *animal* matter Sea-water contains, which occasions it to *run faster* into putrefaction than Fresh-water, when subjected to a *warm temperature, and kept at rest*. Much is owing to the lowness of the situations where Inundations take place, and the quantity of vegetable and animal matter in a state of decay which such situations contain. The exhalations proceeding from these places, whether within the Tropics or in temperate regions, during warm Seasons, are generally more noxious during very moist states of the air, a condition always present in warm climates; and they are still more particularly *hurtful, when* they have been collecting for a considerable time, owing to the continuation of calm weather, and the absence of thunder storms, or those more violent atmospheric vicissitudes which are so beneficial in sweeping away the exhalations accumulated in low and narrow ravines, and among the *thick underwood of Tropical regions*.—*August*, 1837.

(1) "The Epidemic which prevailed in Holland, and particularly in Groningen and its vicinity during the summer and autumn of 1826, seems to have been owing to the partial Inundations of the country by the *Sea* during the preceding winter and spring. Through Friesland, and particularly in the Town of Sneeck, observes Mr. Kerchoff, (Journal Complement, January, 1827,) this cause appears to have had a decided influence. Sneeck is a handsome and well-built Town, the Streets are broad—the population in 1825 was 6373, and the deaths were from 10 to 12, monthly. In the autumn of 1826 it became the centre of the epidemic which ravaged Friesland, and in July the deaths were 23, in August 87, in September 80, in October 127, and from the 1st to the 20th of November 62. The water in the fosses of this Town is generally limpid and running, and that which usually fills the adjoining ponds and lakes is equally pure, and suited to domestic purposes. But after the breaking down of the dykes in 1825, and the consequent Inundations, the water became Salt and brackish, and during the high and continued heat of the following spring and summer it became greenish, and so offensive, that the workmen could not labour in the vicinity without being seized with intermittents and remittents. As the summer and autumn advanced the fever assumed a remittent and even continued form, and the effluvia from the soil became more concentrated and noxious, as the waters were more completely Drained off by the continued warmth of the season. At the same time the bad water was used, without sufficient purification, for domestic purposes. These causes, although instanced here with respect to this particular place, were also present in equal force at Groningen and other places in Friesland; the fever which was at first intermittent, assumed a continued type, and, during the exacerbations, the pains of the back and head were increased. In the majority of cases the liver was much affected. In the months of August and September, the fever assumed the character usually presented by fevers in low and moist situations within the Tropics, the circumstances occasioning them being in every respect similar."—*August*, 1837.

now does, though they may do so in a comparatively small degree; the crop is cut down, and not allowed to rot on the ground, or in the water, as the Jungle does, and the land is clean for many months in the year. If by general Draining, Levelling, removing the neighbouring Jungle, and producing as much as possible a free current of air, the atmosphere we breathe shall be rendered purer, many lives may be saved, and many who are now obliged to leave the place, may be able to remain, and attend to their respective occupations.

NOTE.—*The above Paper was written and given to the Governor General shortly after his Lordship had sent for me on the 2nd September*, 1828.

(*Sd.*) F. P. STRONG.

A. 2.

Continuation of the same subject—Allusion to the Soil around Calcutta—Sir H. East's opinion of the same, after one experimental boring—Remarks on the bad effects of Marsh and Jungle air; allusion to cases and localities—Remarks on Cultivating the Soondurbuns, &c. —1829.

TO MAJOR BENSON, &c. &c.

SIR,

In continuation of some Papers which I had the honor to give some time since for the information of the Right Honorable the Governor General, regarding the healthiness of this Presidency and its Suburbs, I have the honor now to submit some further remarks on the same subject.

In my former statement I alluded generally to the various causes to which I was led to attribute much of the unhealthiness of this place, and amongst these were various nuisances, which I took the liberty of pointing out;—such as the great quantity of surrounding Jungle, the numerous small dirty Tanks, cavities, &c. and the general state of the Drainage. I have since gone further in my investigation. This, and practical observation, have more and more confirmed me in the opinion that I have always entertained relative to these several causes being productive of unhealthiness, by contaminating the atmosphere, and generating what is termed Malaria.

That I am not singular in my opinion of the bad effect of stagnant Drains, is evident (in addition to other authorities which could be produced), from a circumstance of late practical occurrence, which I beg leave to quote. It is what lately took place at Gibraltar, where extensive sickness had prevailed; a Dr. Wilson, who was there, speaks of the Augean Drains, and attributes the illness to Malaria. I have appended the short account he gives of it. If difficulties have existed in respect to Draining in Calcutta and its vicinity, I am inclined to suppose that they do not arise from the nature of the soil; and without feeling competent to give any opinion on the practicable part of improving the Drainage, I am not I think going too far in supposing that the new Canal, now being cut, would afford a great means for the Drainage of all that part of the Town to which it runs parallel. This great improvement is now rapidly going on, and viewing it merely in one point—that of the healthiness of the neighbourhood—we have only to look at the broad

belt of Jungle that has been cut down for it, and the numerous small Tanks which have either been cut through or filled up, to be convinced of its great benefit. Besides commercial and other public advantages, this benefit and improvement would indeed be greatly extended, if the Canal was, instead of stopping at the present Eastern Canal, to be continued round the remaining part of Calcutta, and to join the Tolly's Nullah towards Bhowanypore or Allipore.

Considering that the nature of the soil might have much to do with the dampness and unhealthiness of this part of Bengal, and having for some time past taken opportunities of collecting various Peat earths that abound every where about these parts, I had examined the earth in several places, by boring with a machine to various depths, when my attention was called to the circumstance of Sir Edward Hyde East having, in 1814, made a boring 140 feet deep near the River, in search of a Spring of pure water; he, in a paper which he communicated to the Asiatic Society, remarks, that the different strata through which the borer penetrated have furnished the following observations :—

1st. " The primary object of getting at a Spring of fresh water entirely failed, of which sanguine expectations had been formed by the projector of the experiment, grounded, as it should seem, upon the common opinion that the soil of all the lower part of Bengal was particularly moist, and full of Springs; an opinion, which this experiment, if it can be taken as affording any criterion of the soil throughout the vicinity of Calcutta, has so far happily discountenanced. The first appearance of any damp was at the depth of 71 feet, in a reddish clay with a quarter of sand, and below 76 feet the earth was as dry as before, though the borer must have descended nearly to the level of the Sea, which, as the crow flies, cannot exceed 70 miles in distance, which the fall of the River, commonly computed at one inch a mile, is supposed to be according to its windings.

2nd. " The damp of the climate not being attributable to the moist nature of the soil, nor affected by it, otherwise than as an admixture of saltpetre in the soil may be supposed to have some influence on the exhalations from the surface, must be looked for, principally at least, from causes upon, or above the surface, to the want of a general system of Drainage in a level country, and the luxuriant vegetation, with inadequate openings through the woods for ventilation, which prevent or impede the copious falls of rain at the periodical season, and not unfrequently at other times, from running off properly. The heavy dews at other seasons are not probably more than sufficient to supply the daily exhaustion of the sun, and would rather contribute to the healthiness of the climate. All that seems wanting, therefore, is Surface Draining upon a general plan, and the cutting of broad strait Roads through the woods, as much as possible in the direction of the prevailing winds. The acknowledged improvement of the climate in and about Calcutta of late years, appears to be the natural result of the superior attention which has been paid by the Local Police to these two objects, the benefits of which will be extended with the extended application of the same means. "

Years before this Rennel had made similar observations; and since the period of Sir Edward East's remarks, considerable improvements have taken place,—though it is obvious that much yet remains to be done. I concur particularly in his observations about the Surface Draining, and the cutting of the Roads in the direction of the prevailing winds; and I may add, that in two of the borings which I have made at a considerable distance from each other, and one of which was in the New Canal, I have found that at about 70 feet from the upper surface, the yellow clay that was brought up was extremely tenacious and hard, after which water came up to the surface of the bottom of the Canal, but it was of a brackish nature. This circumstance tends further to prove the correctness of Sir Edward East's opinion as to the difficulty of meeting with a Spring of pure water, and argues, that if such is the general nature of the soil, in digging Tanks, no object is to be gained by

making them of extraordinary depth, under the expectation of meeting with springs of fresh water, but that they must be considered rather as Reservoirs for rain water; and for that purpose, a considerable depth may be proper. But if at a certain depth, say at 60 or 70 feet, brackish water is generally found to exude from the earth, it might not be well to dig through the hard clay which is found to lie a considerable thickness above such brackish water. These investigations seem to prove that the soil hereabouts, which is unquestionably alluvial, does not contain so much moisture *below the immediate surface* as is generally supposed, and the *production of impure air* is most probably from the *surface* rather than from *below* the surface, though possibly in *other soils and climates* it may be otherwise; therefore if a system of Surface Draining, by open shallow Drains, were adopted, the advantages contemplated by Sir Edward East, might be obtained.

I take the liberty of alluding to considerable advantages obtained at Madras by the establishment of a Board of Health, and referring to the recorded opinion of the Justices of that Presidency, in their report at the last Quarter Sessions, of the utility of this Board, and of the improvements that had arisen from the attention of that Government to general points of clearance and cleanliness. If in that place, where they have the advantage of a Sea wind, such nuisances as these alluded to, are felt, it is fair to consider that they will be more felt here, where the vegetation is much more exuberant, and the population greater. I would here respectfully submit, that it is worthy of consideration whether similar proceedings to these of Justices in Quarter Sessions at Madras, might not here be attended with beneficial results, and also, whether a Board of Health at each of the large Districts, or Divisions under the Bengal Presidency, might not be beneficial. It might be composed of the Senior Military, Civil, and Medical officers; but should this not be deemed expedient, a Board or Committee of Health in the Presidency itself might be attended with incalculable advantages. When I first arrived in 1816, the South-east part of Chowringhee was covered with similar huts, and compounds to those alluded to at Madras; at that time I remarked certain well-built houses near those parts were uninhabitable, and the damp and evening mists about them were proverbial. Some time afterwards, those huts were all destroyed, several large Tanks were made, and the land generally levelled for the purpose of building good houses. Rawdon street, Loudon street, Moira and Hungerford streets were finished, and I now observe the formerly unhealthy houses I have alluded to, occupied, and no longer considered dangerous to reside in.*

I alluded in my former paper to the very Jungly, neglected, and irregular state of the lands on each side of the Russapuglah road, leading from Birgetallah, Chowringhee, down to the place where the families of the Mysore Princes reside. I am every year borne out in forming the same opinion, and coming to the same conclusions I have there expressed, by my observation and attendance upon the Princes. I invariably find that when the wind blows over these Jungly and Swampy parts, towards their habitations, fever, and that often of the most virulent kind I have ever met with, prevails, and this more especially where the houses are low, or surrounded with marshy Swamp or Jungles, which is the case with several of them. There are some others, where the heads of the family have built their houses, three and four stories high, in the highest apartments of which they have their Zanána, and here they rarely suffer; but I know some lower-roomed houses, where the grounds are kept clean and airy, where they are also healthy, although perhaps not quite so much so, as in the higher houses. With the exception of accidents which occur now and then, and hydrocele, to which this family seem peculiarly liable, and which

* Huts are now rebuilding, and the place getting filthy.—*August 8th*, 1837.

often requires operation and attention, I should consider the Princes generally healthy, their usual complaints being remittent and intermittent fever, and its consequences, such as spleen diseases, affections of the liver, and other visceral obstructions; and although I think I am correct when I state, that since I have had Medical charge of these numerous families, now nearly nine years, I do not know of any one fatal case of chólera morbus, or one fatal case of small-pox having happened, (though these disorders have yearly carried off many in the adjoining villages;) but after the last rains I had a considerable number of spleen cases among them. I expect these families will now be tolerably healthy till the rains set in, when those in Jungly and damp situations must be expected again to suffer. I have mentioned this regarding the Princes, because the facts I think go far in confirmation of my main arguments, the unhealthiness of Jungle and Swamp.* It would be useless to enter into a detail of the particulars, which I could easily do, to prove the unhealthiness of numerous localities in and around Calcutta; one however I may allude to,—it is the case of the late Rev. Mr. Mosquito, a Roman Catholic clergyman, who lately went into a lower-roomed house at Siáldah in the Suburbs, which had a small compound covered ancle deep with dead leaves of trees, and close to this compound was a large tank, then filling up with stable straw and other filth. His fever was of the most virulent kind, and ended fatally last Friday the 17th instant. This particular cause of illness I believe to be very common, which makes me thus anxious to bring it to the notice of the Right Honorable the Governor General, and I may be allowed briefly to mention, that I have visited many of the Villages bordering upon the Lake, and that I find the Inhabitants in point of appearance and health, to correspond very much with the state of those people who inhabit Malarial and Marshy lands in various parts of Europe and America, as pointed out by well-known authors. Since my remarks about what I had seen of the Lake I have been occasionally there, and I found that much of the land, which during the rains was covered with water, has since been dry, with Jungle growing upon parts of it; the tides have now risen higher than they were two months ago, and have covered at high water part of the land which had been left dry; these lands, being daily alternately wet and dry, must be a constant and plentiful source of Malaria, and fortunate indeed is it for the Inhabitants of Calcutta, that these Marshes are not situated South of it, instead of where they are. From the borings I have made in many parts of them, I should say that it would prove a most productive soil, fully equal to any about here. A moderate portion only of sand is met with, until you go to quite the other end of the Marshes, near Bamanghatta, where, more sand begins to appear. In parts where I bored deep, I found in my course the same charred, or peaty earth, to be found every where about Calcutta, and again below this a very tenacious yellow and slate-coloured clay. Of the existence of an ancient Forest, all now covered by earth, there is no doubt whatever, as almost every where, about 20 feet deep, large timber trees are found in a state more or less of decomposition, but the superfices of the Salt Marshes, and down to 12 feet, is certainly composed of an earth well calculated for embankment.†

* Since writing this, Prince Soorooroodeen has been carried off by diseases, I believe entirely produced by the filthy state of his habitation—he allowed the most noxious Jungle to grow all round his house up to the very doors and windows. I could not prevail upon him to remove this, and I have taken several gentlemen to the spot to shew them what a magazine of Malaria existed, and how wonderful it was that life could be preserved within it. His diseases were fever, neuralgia, latterly partial insanity, and he died in an apoplectic fit.—*August*, 1827.

† Since writing this, an embankment has been made permanent on the Western side of the Navigable Channel, nearly half across the Lake as far as the Byamcarl; the lands, beyond are tolerably high, filled with Jungle.—*August*, 1827.

These remarks bring me to the Jungle and Waste Lands beyond the Lake, and to the foregoing observations, I hope I may be allowed to add a few remarks on the subject of Cultivation. From all the information I have obtained, I am led to believe, that these *Waste Lands in the Soondurbuns are capable of being made to produce a variety of crops.** Some Coffee plants which I gave to a cultivator of Soondurbun lands last year and the year before, and which were planted out by him on the cleared lands, are, I am informed, in a thriving state; it may therefore be worthy of consideration, whether, if this plant is found to flourish, it does not hold out an additional encouragement to the clearing of these Jungle lands. I am aware that various opinions have existed respecting the cultivation of Coffee in this country, and that its success has been thought doubtful; several experiments have however succeeded, and the Coffee is considered of a fair quality. I have myself made the experiment to a small extent, and judging from the appearance of the plants in a piece of ground of about 10 acres, I have every reason to believe that the cultivation of Coffee here will ultimately succeed. I sent a thousand Coffee plants as far up the country as Moradabad, upwards of three years ago, and the last accounts I heard of them were very favorable. *Cotton* is perhaps another article that might be produced to a great extent in the Soondurbun lands. In an article in the Edinburgh Review, (No. 91, June, 1827, page 25,) *on the rise, progress, present state, and prospects of the British Cotton Manufactory*, it is stated, "that previously to 1790, the supply of raw Cotton for the British manufacture was principally derived from the West Indies and the Levant. But after the termination of the American War, Cotton began to be cultivated in Carolina and Georgia, and has succeeded so well, that it now forms one of the most valuable productions of the United States. American Cotton is generally known by the name of *Sea-Island*, and Upland; the former is the finest Cotton imported into Britain. It grows on small sandy Islands contiguous to the shore, or on the low grounds bordering on the Sea. The Upland grows at a distance from the coast." This article was written before the late American tariff, which has naturally led to discussion upon the cultivation of Cotton, and it has been considered that it may be cultivated with great advantage in this country to almost any extent, and of a quality not perhaps inferior to that produced in any other part of the world.† From the description given in the Edinburgh Review of the kind of land on which the finest Cotton grows, it appears in some measure to *assimilate to the Soondurbun lands.* I am told that the Bourbon Cotton grows well at Diamond Harbour, and previous to the last rains, I had some rows of the Bourbon cotton trees in a garden raised from the seed, and thriving abundantly, but during the rains they were so very exuberant that I cut them down; two or three only were left, and although entirely neglected, and most of their branches cut, they soon came into blossom and produced cotton, which I neglected taking care of, but I got from them quantities of seed, which I have given away.

From this trifling experiment however it is evident that the plants would thrive here, and it might perhaps be cultivated to a great extent in the low lands of the Soondurbuns. Should these lands become cleared, the cultivation of Sugar-cane on them may become an object of importance. It was observed by a Mr. William Fitzmorice, (who

* American cotton grown in these lands, and producod at the Agricultural Society, has been considered excellent.

† On the 20th of October, 1829, the Governor General expressed a desire to assist the Agricultural Society of India to promote the cultivation of superior Cotton and Tobacco, and the Court of Directors in 1831, sent out American Cotton Seed, and Government sanctioned an experiment at Akra in the Agricultural Society's ground, the particulars of which will be found in their report published in 1835. The Society also sent American seed to various parts of India, and the samples of cotton sent by several of the experimentalists were excellent.—*August*, 1837

had been in the West Indies many years,) in a statement he made to the Honorable the Court of Directors, and which he printed in 1793: "That the more he saw of this luxuriant soil, the more he was convinced that they might annually import from Bengal any quantity of Sugar, and a proportionable quantity of Rum of a superior quality, without interfering in the smallest degree with the present cultivation and manufactories of Bengal. Indeed that the waste land occupied by the tigers, between this and Injella would produce nearly as much Sugar as the Island of Jamaica." Mr. Fitzmorice, from his printed work which I have, appears to have been practically acquainted with the cultivation and manufacture of Sugar, as it was carried on in the West Indies, and was therefore probably capable of forming a correct opinion on the subject, as well as on that of the cultivation of Coffee, of which he also wrote, but which Coffee cultivation has only (so far as I can learn) been attempted of late years, though the plant has long since been found to grow well in private gardens; much of this land to which Mr. Fitzmorice alludes, has since been brought into cultivation. Rice is, I believe, the principal crop, but of the vast tracts which remain in a state of waste Jungle on the East of the river Hoogly, and towards the Soondurbuns, much might no doubt be made productive, and if Sugar should be found to thrive on those lands, it is evident that it might be cultivated to a great extent.

You will oblige me by laying this paper before the Right Honorable the Governor General, at his Lordship's leisure.

(*Signed*) F. P. STRONG,
Surgeon to Suburbs of Calcutta.

April 23rd, 1829.

A. 3.

Continuation of the same subject—Boring for Artesian Springs advocated—Success in Europe of late years, giving the authorities—Further remarks on the Soondurbuns, with quotations from Baron Humboldt on the advantage of Civilization, and the Abbé Man on the healthiness produced in the Netherlands by Clearing, Cultivation, and Civilization.—1829.

To MAJOR BENSON, &c. &c.

SIR,

In the Papers which I had the honor to submit some time ago for the information of the Right Honorable the Governor General, I entered into an explanation of what I conceived to be some of the principal causes of unhealthiness in Calcutta, its neighbourhood, and the lower part of Bengal. In doing this I was naturally led to make some remarks upon those great sources of Malaria, or impure and unwholesome air, the Salt Water Lake, and the Jungly Soondurbuns adjoining; considering that the Draining of the one, and the Clearing of the other, would be a great Public benefit, if even done only with a view of removing such causes of Malaria, and consequent illness.

In carrying into effect such measures, one most important *necessary* of life must be obtained, or else it is to be feared that any Improvements which may be attempted will proceed very slowly, and cannot ultimately be carried to a considerable extent. The article to which I allude, is a good and sufficiently abundant supply of fresh Water *fit* for drinking.

This is an article even much wanted in Calcutta itself, particularly during the dry and hot months; and much illness amongst the Natives has, and no doubt correctly, been attributed to their drinking *dirty*, *stagnant*, and *putrid* Water. The supply of *good* Water might, I am strongly inclined to hope, be much increased in and about Calcutta, and that by the simple, speedy, and comparatively trifling expensive plan of boring;* should this plan be tried and found to succeed here, it might probably meet with similar success if tried upon any of the cleared lands, or upon the Salt Water Lake, when Drained.

My hopes of success are in a great degree grounded upon the examples of boring which have taken place in England, where this mode of obtaining a good and constant supply of fresh water has lately been much resorted to, and has met with the greatest success, not only in London and its neighbourhood, but in the lower parts of Lincoln, Kent, and other fenny Districts.† In some of these, where the Inhabitants and their Cattle suffered much from the want of good water, the evil has lately been removed, where this essential necessary of life has been supplied by means of perforations made to a great depth in the soil by boring with an iron auger, so as to reach and bring to the surface the deep seated springs.‡ To some of the instances I beg leave to refer. Borings which have been made from 200 to 400 feet deep, have been found to cast up from 15 to 20 gallons of soft and remarkably pure water per minute, which without the use of Engine or Pump will rise from 20 to 30 feet above the surface up a tube or guide-pipe.§ Wells have been bored at Tooting, Mitcham, and *Merton*, in Surrey;|| one at *Merton* is said to cast up 200 GALLONS of water a minute,¶ and one at Tooting nearly 100 gallons. At Leeds 100 yards deep has been bored for water, and cast-iron Pipes used for conducting it.** Some partially unsuccessful experiments have been made in chalk.††

* From M. Arago's work on Artesian Springs, 1834-5.

Issues from principal Fountains.

St. Andrè nearly two tons per minute.
Bages, 333 gallons per minute.
Tours, 237 ditto ditto.
Merton, 200 ditto ditto.
Rivesalte, 176 ditto ditto.
Lillers, 155 ditto ditto.

Depths bored.

St. Nicholas d'Ailermont through 7 sheets of water 1,030 feet.
Geneva, 682 ditto.
Suresne, 663 ditto.
Chiswick, 582 ditto.
Bethune, 461 ditto.
1834 M. Champaiscan, 275 ditto.

† Edinburgh New Philosophical Journal, December 1828, p. 170.

‡ Mechanics' Magazine, vol. i. p. 293.

§ Ditto, vol. ii. p. 31.

|| Since my writing this, M. Arago has particularly alluded to *this* boring.

¶ Mechanics' Magazine, vol. ii. p. 60.

** Ditto, p. 382.

†† Since this, several successful operations have been performed in chalk.

But water has been obtained at Sittingbourne, in Kent (in which neighbourhood it may be remarked, that the land is level and low) after boring 336 feet. In Bedfordshire 400 feet, and in Surrey near Dorking, 440 feet in depth have been bored and water obtained.* At Hammersmith, boring is said to have been much practised lately. The water obtained there, which was of a superior quality, and the supply regular, in some instances 200 or 300 gallons per hour, but in no case is it said to be less than 80 gallons per hour, and the depth bored has been from 300 to 380 feet before the water was found, after which it has run over different heights above the surface, according to the strength of the spring. In the Duke of Buccleugh's grounds at Richmond Hill,† (where an excellent apparatus for perforating the different strata of the earth is said to have been used,) after boring 252 feet, a supply of most excellent water has been obtained, yielding 13 gallons a minute, and rising, as in a Fountain, 24 feet above the surface of the earth. These examples not only shew to what extent boring for fresh water has been practised in England, but it will also be seen from them, that this method has been successfully tried in both high and low situations, and through various kinds of soil. I will also add a quotation from a work apparently of much practical utility. In Loudon's Encyclopædia of Agriculture,‡ p. 671, it is said there are "borings in Middlesex and Surrey which afford a continuous and abundant flow of water, equal to 8 gallons per minute. A very copious Fountain which rises twenty feet above the surface, has lately been obtained by the same means in the grounds of Ravenscroft Park, the seat of G. Scott, Esq. near Hammersmith." Indeed there can be little doubt that in the majority of situations, not only in Britain but throughout the world, water might be found by boring or digging, down a few scores of feet. The expense in England, as mentioned in the same work, (p. 671,) is stated to be equal only to one-eighth that of well-digging, and it is remarked, that "the advantages of flowing springs of good water, which by these means may always be obtained on the sides of roads, and in a variety of other places where water is not at present found, are incalculable, the cost very small, and the operation easy and expeditious."

If the advantages are so incalculable, and so easily obtained in England, it must be obvious that they would not be less so in a Climate like India, and particularly in this part of the Country where they are so much needed, and where, although the water of the Hooghly, as far down as Calcutta, may be tolerably good, during most seasons of the year, and tolerably good water may be preserved in Tanks, yet the supply often becomes scanty, and when the Tanks are low, brackish and bad. Boring, if found successful, as I think it would be, is therefore a matter of more importance than it may at the first mention of it, appear to be. In the Fort, in particular, it might be found to afford that supply of water which all attempts to obtain have (I am told) hitherto proved unsuccessful and expensive, the wells being all brackish, and the Puckah-built Reservoir, made for the purpose of retaining a supply of rain water having, after repeated expensive repairs, been

* Mechanics' Magazine, vol. v. pp. 230, 232, 258, 315, &c.

† Ditto. ditto. vol. vi. p. 167.

‡ In this work will also be found an interesting account of the mode of raising Lands near the River Humber by Warping, or letting in the River water, and allowing the warp or mud to settle. By this method Lands have been fertilized, and raised from 6 to 16 inches in the course of a year. An article also in the Mechanics' Magazine, vol. — p. 99, gives an account of this method of Warping Lands by the water of the River Ouse, and speaks of raising Lands near 3 feet in the course of a year. The water of the Hooghly containing a much larger portion of mud, might perhaps be applied to the same useful purpose of raising the Soil of the *Salt Water Lake*, or other neighbouring low Land.

found incapable of holding water, and its use for that purpose being therefore discontinued. Several borings for fresh water have also been made here, and amongst them, some in the Fort, and the only reason why they have not been successful is, I believe, on account of the inefficiency of the boring apparatus, and its not enabling those, who have made the attempts, to go sufficiently deep. In two borings made in the Fort in 1820, they were not able to penetrate deeper than 122½ and 128 feet: in both these attempts there was no indication of fresh water, but the earth brought up was occasionally damp and moistened with water of a saltish taste; a great deal of stiff clay was met with, and in both cases the *rods broke* and remained in the ground. The deepest boring I can find an account of, is that given by Sir H. East to the Asiatic Society in 1814, and that was 140 feet; no *fresh* water was found, and here the *rods broke* and were left in the ground: the only other accounts of any boring I can find was in 1804-5, and 6,—wells from 20 to 40 feet deep having all proved so brackish as to be unfit for drinking. These borings of 1804-5, and 6, which make four in all, were undertaken for fresh Springs. In the first of these Borings, after surface mould, sand, &c. the borer passed through hard clays with kunkur; it penetrated to 75 feet, when the water rose to the height of the water in the adjoining wells; it was analysed by Dr. Hunter, he considered it unwholesome, as containing a very large quantity of common salt, muriate of magnesia, and clay.

In the second the same sandy clays, kunkur and white and yellow sand, presented themselves at 70 feet: the borer was brackish at 81, and at 101 feet the rods came up nearly dry. A well of tiles had been made round the borer for the first 30 feet, and the water rose into it within 7 feet of the surface, fully four feet of the ground. At this place the ground was artificial above the general level of the country. During the whole dry season the water only subsided in this well 3 feet, and was on the 3rd June, 1805, only 10 feet below the surface, whilst the water in wells at a little distance was 30 feet below it. Here the lowest depth was 119 feet; coarse-grained sand was found, and the soil was very hard, *the borer broke*, and was not recovered. The third was in December, January, and February, 1805-6; similar earths were obtained as above, and from 114 to to 127 feet was found fine yellow sand, coarse sand, and very hard earth—here *the borer broke and* 91 *feet of rods were lost*. At 65 feet the water was brackish, but the deeper water rose to within 4 feet of the surface, and was well tasted. The fourth attempt was in March, April, and May, 1806. Similar earths presented, very hard, from 120 to 127½, yellow clay, sand and yellow sand; here the auger *was* partly *broken*, the edges were found sharpened like a knife. It was remarked that the water at 66 feet appeared tasteless, probably owing to the heavy rains that season in March, which had made the water in all the wells tolerable.

The late Mr. Jones, a person who was well known as having opened the Burdwan Coal Mines, made a boring, and found the same earth and clays, but he did not go beyond 70 feet deep; here he found kunkur, clay, and yellow sand, and he says at 70 feet—through a stratum of red coarse sand—issues a spring which is acted upon by the tides in the River. The borings I have made, have been comparatively trifling, for want of proper apparatus. I however bored down to 40 feet near the west margin of the Lake, where I found very stiff dark clay, and at the bottom some hard kunkur mixed with it.—As I mentioned in my last paper, I bored at the bottom of the Circular Canal, and found water at the depth of 70 feet from the upper surface, which rose 50 feet, and formed a Pond, which was banked in at the bottom of the Canal. This water appeared to me and my friends brackish, but on its first appearance the labourers drank it, and said it was good. At this place the clay, which is of great depth, and in parts beautifully yellow, and containing kunkur, was so very stiff, that at 50 feet, a large and strong auger was twisted in a most extraordi-

nary manner, and two Europe-made strong Iron Hooks were broken in extracting the rods, which was done by means of a strong gin and windlass.

In a Garden in the Circular Road, about two miles from the above place, I bored through very stiff clay to 70 feet deep, and came to some kunkur, and I suspect other harder substance, which prevented my getting further, and I found the auger much scratched and polished.

At Russapaglah I could not penetrate deeper than 70 feet; at this depth I applied a smaller auger to the bottom of the larger rods, with a view to perforate where the large auger failed, but this broke, and was left 70 feet in the ground. In these borings I found myself much disturbed by the frequent falling in of sand from the upper strata, and I had not a cast-iron tube to prevent it: such will be necessary in any future borings, and a proper frame-work, and mechanical means for raising the rods will also be required.

I am told that there are in Fort William different sets of boring instruments sufficient to go a depth of 600 feet or more, and that they are of greater strength and excellence than those used in 1805 and 1820; but a gentleman who has lately arrived from England informs me, that a newly invented borer is now in general use, and much approved of.

Having given His Lordship a detail of the Plans which I respectfully suggest might be adopted to obtain a supply of fresh water, I also take the liberty of mentioning a few circumstances of information which I have picked up in the course of my inquiries relative to the Soondurbuns; as the circumstances tend to support the principle which I laid down in my former communication of the prevalence of Malaria in all Jungly, Marshy, and Ill-drained situations, and of its effect upon the Inhabitants of such places.

Baron Humboldt gives Tables to prove that in certain places the duration of life has been greatly prolonged by attention to cleanliness, improvements, and civilization. A little attention and inquiry will, I believe, go far to prove that there is much room for such change amongst the Natives of Bengal, but more particularly amongst the Inhabitants of the small and thinly scattered Villages in the Soondurbuns, who I am assured are a most wretched and short-lived people, continually suffering from poverty, and want of cleanliness and civilization, and from disorders produced by bad air generated in the Jungles surrounding them. Numerous inquiries I have made among intelligent Natives confirm this, and although gentlemen who have passed through the Soondurbuns may differ a little in this opinion, it is not to be supposed that their curiosity has led them to visit the villages in the interior, or to make inquiries of such a nature. An intelligent Native, who has much experience of the Soondurbuns in those lands considerably South of Tarda, has assured me repeatedly and most positively, that it is his belief that scarcely one in ten of the Villagers escape Fevers during the months of July, August, and September. The Villages he says, consist of 50, 100, or 200 people, including men, women, and children. They have their Native Doctors, but many die annually of Fever, and the spleen disease prevails very much among all, old and young; these opinions apply to the Inhabitants born and always living in these Jungles, whose constitutions are known to be more capable than others of resisting the poison of Malaria. The Darogahs, Chaprassies, and Servants employed by Government in the Salt Department* are sooner attacked, and when ill they always obtain leave to go to their homes. The Villagers are generally Salt Molungies, Wood-cutters, Boatmen, Fishermen; some shoot game, others collect wax and honey, and others spin and

* The Government having lately removed the Salt-works more to the Southward, has already been found beneficial to the more Northern Grantees, as the Salt Molungies have willingly become Agriculturists; and it will be seen in the Map that along the line of the new Navigation, running direct Eastward from the Lake, a very great deal of Jungle has been cleared away.—*August* 1837.

make coarse cloth for the villagers. Of the little land at present cultivated, I am informed rice is the chief produce, and grain, cullie, and other vegetables grow about the villages, in all which there are Tanks: without a Tank, my informant assures me that no husbandman will settle to work, but wherever a tolerable Tank is made, that of itself will bring Inhabitants. I do not believe that any Europeans could live in the interior of the Soondurbuns as they now are—but were it possible to clear them by cutting down and cultivating from their external extremities, and go on gradually towards the interior, and if the land were well Drained, I see no reason why these parts should not be as healthy as any other place in Bengal. With regard to the external clearing, I allude more particularly to the thick and low Jungle bordering upon the Salt Water Lake, and which, from all I can learn, is more productive of Malaria than the forest Jungle towards the Sea. If I recollect right, I think Messrs. Schalch and Morrieson, when Surveying the Soondurbuns found it so; the latter in particular, as he had a predisposition to fever, and he found in the deep broad Rivers, where the timber trees around him were high, admitting wind, and where low Jungle did not prevail, that himself and his servants were well, but when he approached towards the Tarda low Jungles, himself and his attendants suffered. I have heard of one respectable countryborn gentleman, who by clearing with great industry and assiduity an extensive tract of land beyond the lands I have been speaking of, fell a victim to Malaria. Another, who has cultivated and cleared a good deal of Jungle lands between this place and Tarda, is constantly suffering from fever, though he visits his grounds only one day at a time, and that only two or three times a month. He employed as an Overseer a healthy Portuguese, but he died of fever before he had been there two months.

I may here mention as regards fresh water, that this latter cultivator informs me, that, in March 1827, he dug a Tank on a high spot, in which he found a Spring perfectly pure, which filled a place walled in to retain the water about two feet high, and the water continued at the height, although the two adjoining settlements, and all the passengers, to the amount of some hundreds, went to this well daily, and if it did sink a little in the day it was sure to fill up the following morning. He made it into a Tank of 10 cottahs, and it continues to supply all the neighbourhood, who without this, would have to go a distance of 10 or 12 miles for Water. He also says, that near a Village called Narainpore, there is a fresh spring, about three feet from the surface, but such was the idleness of the villagers, that they would not dig a Tank; and when he asked them why they did not prefer living upon the higher ground on the river side, they said, they were afraid of being plundered by the boatmen, which is a common occurrence, and he tells me that no Native Moodie or Merchant dares to settle any where except near a Company's Thannah. This individual says, that he finds very generally upon spots a little raised, a simul or cotton tree, which makes him think these parts were formerly inhabited; and the other gentleman found an old house. I believe also, that the remains of old Tanks are here and there to be found:* upon the whole, I have no doubt that if boring for water in these parts should be found inexpedient or inconvenient, that it can be collected and preserved in Tanks, at least as good as such water generally is about Calcutta, so that the want of water should not form an objection to the clearance, and ultimate cultivation of these Jungles, which are so close upon Calcutta. But the boring appears to me to be a preferable mode, as being cheaper, more expeditious, and, as by going to a much greater depth than can be gone in Tanks, the probability of getting pure water, and a constant supply is increased.

These Soondurbuns—unlike the Campine of Brabant, in the North of the Netherlands,

* Since this period about 1,00,000 biggahs have been cultivated, and in all directions the same proofs of former cultivation appears.

which the Abbè Man states, "originally consisted of sand, covered with heath, interspersed with Lakes and extensive Marshes, and here and there with woods of fir, and which tradition reports to have been once a part of the Sea, and unlike the arid wastes in some parts of India,—are already fertilized in the highest degree by the decaying vegetation of years, and are, I respectfully conceive, calculated to produce a new and vast revenue to the State after a time, *and when a Scheme* shall be adopted that shall induce labourers to commence this work to a considerable extent;*† for it is not because the lands are barren that they are uncultivated, but chiefly because the air, now poisoned by the overgrown Jungle, is inimical to life, and every year's progress in the removal of this evil adds, in my humble opinion, most materially to the general health of the country. Even the poor Campine of Brabant, after partial failures, is now stated by the above cited author, to possess many extensive tracts well cultivated, and is covered with villages, well-built Houses and Churches. No doubt much of the country has been cultivated since the period at which Lord Cornwallis remarked, that he might with safety assert, that one-third of the Company's territory in Hindustan was a Jungle, inhabited only by wild beasts. We know of Jungle as near the Presidency as Sooksagar, under European management, having become invaluable land, but in the immense forest Jungles, and uncultivated tracts of Hindustan, it is not impossible that a field might be opened in which the Natives, and perhaps others, might raise for themselves an abundant supply of the necessaries of life; the field appears inexhaustible, and would be employment for thousands, while the cause of much disease and sickness (both among Mankind and Cattle), would be gradually diminished; for it is ascertained that in those years in which Malarial endemics and epidemics have prevailed, epizotic disorders have prevailed amongst Cattle. Without going into ancient authority, a late writer, Dr. Macculloch, states it as a general fact, that Cattle or animals of differnt kinds do become sickly or diseased in the same situations which produce the diseases of Malaria in the human race, and that the consequences are as resembling, or analogous, as they could be under the differences which exist.‡ He states these facts to have shewn themselves in Egypt, in Hungary, in St. Domingo, and Gaudaloupe, as well as in France at Rochelle, and in Auvergne and Raussillan, and alludes to that particularly pointed out by Bailly, of the year 1812, at Arles, and adds that analogous observations have been frequently made in Italy; and not to quote more than is necessary, the years 1711, 1738, 1745, 1772, 1783, and 1795, are among those which have been particularly recorded for epizotics among Cattle, each of them being also noted seasons of epidemic fever, or of the prevalence of Malaria; and that further they all occurred in the months of August, September, and October, and were also confined to the Marshy or unhealthy districts. I am acquainted with some Indigo Planters, who have remarked illness and mortality to prevail among Cattle in times when Cholera Morbus has scourged the land, and I doubt not that there are many persons in

* If the money expended in clearing and cultivating Saugor Island had been expended on Land South of the Lake, the result, I humbly conceive, would have been most advantageous to all the parties,—and quite different to the result of the Saugor Experiment; while Improvement and Healthiness East and South of Calcutta would greatly have increased.—*August* 1837.

† Grants were made in 1829 and 1830 to numerous persons about Attara Banka, to the extent of 500,000 biggahs, about one-tenth of which is now supposed to be in cultivation, in spite of the Agency failures and the dreadful Inundation in 1833; however, several Grantees have done nothing, and the five years having long expired the land is resumable by Government to give to others who will clear it. At this time, October 1836, several Pilots, who have cultivated several thousand biggahs near Attara Banka, expect as good a season as they had last year, which was highly satisfactory to them.

‡ Macculloch, p. 453. Although not noticed by Dr. M. another ancient author, Livy, remarks, that in the same years in which epidemic "*pestilences*" appeared among the people, there was also a great mortality among the Cattle

Bengal, who have remarked the same thing. I myself observed the same in the neighbourhood of Dacca some years ago.

The last year has been more healthy than any I have known,* and is the first year since I have been Surgeon of the Suburbs that I have not had an additional number of Native Doctors, 20 or 30, stationed at different posts with medicines and instructions to administer to every case as quickly as possible among the Natives, and I believe Calcutta itself has equally escaped the scourge this year; certainly Calcutta and the Entally Suburbs have been generally more healthy than usual. With my respectful apologies for the length of this paper, I conclude by alluding to one or two localities, particularly the Western end of the old Entally Canal, as being always in a filthy state. It was only early last week that I was called, in consultation with another medical gentleman, to see a child dangerously ill in the house exactly at this end of that Canal. My professional friend now informs me that the child is doing well, but that the father and mother have since been both seriously ill, that the latter was delirious, and for some days nearly dying, they have quitted the house; and such is the nuisance here, that a gentleman and his family have been obliged to quit the very next house to the one alluded to, which is only just behind the Marhatta Ditch, opposite the Dhurrumtollah. As the first step towards eradicating an evil, should be to ascertain its cause with as much certainty as the subject will allow, in order to judge of the capability of applying a remedy by its removal, so I have little doubt, that upon examination and inquiry, the causes of unhealthiness of particular situations in the Town and Country might be readily traced, and in most cases removed, without so much difficulty as might perhaps be expected. It is not to be wondered at, that particular parts of the country or the Town should be unhealthy, if in the one case they be covered with Jungle or Swamps, or in the other they abound with Nuisances which equally *contaminate* the air. Pure *Air*, as well as pure *Water*, is an indispensable *requisite* for Health, but it is impossible to look at the stagnant *pools* of water, the *dirty* ditches in the Native part of the Town, and particularly at the low ground within the Strand road, from where the Hindu bodies are burnt, almost up to the new Mint, which ground is in many places covered with stagnant filthy black water, into which stable dung and other filth is thrown to fill it up, and not to be convinced that such places must make all others near them more or less unhealthy, while there can scarcely be a reasonable doubt, that if these causes were removed, the air would be more pure, and the situations now affected by them equally healthy with the best parts of the Town.

23*rd July*, 1829.

A. 4.

Topography of Suburbs generally,—1830.

Many localities have been pointed out to me as unhealthy, and the filthy state of the Músulman Burying-ground in the Circular Road, is considered particularly so, as making Cassiah Bagaun, very unhealthy; it is surrounded by broad ditches of stagnant water, filthy to an extreme degree. Different parts of Tiljullah and Entally are also well known as unhealthy, and certain particular houses are considered uninhabitable. A few years back a great number of poor were turned out of grounds† purchased by the

* In the early part of 1828, there was a good deal of fever in the Entally Suburbs for a short time.

† Short-bazar grounds.

Lottery Committee, and they built their huts in a particular part of the Eastern Suburbs,* on the other side of the Circular Road, surrounded by Jungle, and badly Drained; so great a number died of cholera, that it was found difficult to dispose of the dead bodies; this was after a sudden change of the weather, but these new Inhabitants, who had located upon a mere jheel, suffered much more than the Inhabitants of the surrounding neighbourhood. The small houses occupied by poor Europeans and Christians of colour, near and on the banks of the old Entally Nullah, are dreadfully unhealthy;† and people are constantly obliged to quit. Continuing along South of the old Nullah towards the Lake, there is a great proportion of ground entirely neglected and uncultivated, and this sort of ground is to be observed here and there, among garden ground, filled with high trees, the mangoe, jack, &c. and much of this in a filthy state; then you come upon low rice fields, and then the borders of the Lake appear. There are to be observed the remains of several old roads made by the late Mr. John Elliot, but most of these are so covered with Jungle, their ditches filled up, bridges broken, and the Jungle so impenetrable, that it is impossible to traverse them; the Eastern Suburbs I now allude to, must, at a former period, have been in a very superior state to what they are now, and there are several old brick houses, chiefly Native, and apparently deserted, which go to confirm this fact. In the South, towards Balleegunge, and near the rice fields, the grounds about the villages present numerous excavations of earth, taken for the purpose of brick-making;‡ these being left open, all sorts of nuisances collect in them, but more particularly the leaves of trees, and these decomposing with water and heat, must afford a rich production of Malaria. Still further South, Balleegunge is Jungly and badly Drained, and Bhowanipore and Russapaglah present a continuance of the same evils, many parts looking more like Soondurbuns, than Inhabited Villages.

Then going back, and looking to the North of the old Entally Canal, the same description applies, the same obliterated roads which formerly ran North and South in the direction of the winds, and which were broad and *once* had good ditches and bridges, all are now useless, and covered with Jungle, the habitation of jackals and snakes; and the same belt of Jungle and Villages is continued towards the Dum-Dum road.

This constant source of contaminated atmosphere all *round our City is sufficient to produce disease, however cleanly we may be within;* but *Calcutta itself*, has not much to boast of in that respect, although it is decidedly much more healthy than formerly, even within my recollection and practice here. The opening of Roads by the Lottery Committee over parts which I have often traversed when in their unimproved state, has evidently produced a healthiness and cleanliness before *unknown*, and this *fact* goes far to prove what *good* may be done by the *free* admission of the prevailing Winds, by Cleanliness, and by Surface Draining. In the City, and in the back lanes of Chowringhee, the Circular Road, &c. the Bazars, which have sprung up irregularly, have become an intolerable nuisance, which ought to be abated.

The Drains all about Colingah, and towards the Circular Road are bad generally,—currents of water meeting and running in all directions. Broad roads, with good Drains should be continued from the Circular Road in the direction of the plain,§ which is a Rice

* Marked on the Map *Curria*.

† Since this was written, a Mr. Ward, the senior clerk of the Sudder Board of Revenue, who I had often advised to quit his house, which was on the banks of this Nullah, has fallen a victim to Malaria. He was naturally a very healthy, stout, active, and strong man, when he went to reside on this spot.—*August* 18, 1837.

‡ I hear that there was formerly a Regulation which prevented Brick-making on this side of the River, and that formerly all the bricks were made on the other side of the Hooghly.

§ Formerly there was a very long ditch, which ran out far towards the Lake, but it is now nearly obliterated. This was brought to my notice by Captain Jenkins.

cultivation towards the Lake, and cross roads should be made at convenient distances; if such roads* were made, and the Jungle cut down, many persons with small incomes would be glad to build in these parts, more particularly about Entally and Tiljullah, from being so contiguous to Town, where many of such persons have offices to attend daily. Ballygunge is rather too far off for such people, and would appear to approximate to such places as Allipore, and Garden Reach, for gentlemen who can afford to have gardens and large compounds and out-houses. In all probability such new buildings in Entally and Tiljullah would be built upon an improved plan. If small houses, or indeed any houses, were built upon godowns, with apertures to keep such godowns well aired,† which might be used for servants, or to keep things in, would it not be better than the out-houses we now see, with the high compound walls surrounding every place, and which prevents the ingress and egress of air, and renders the air the inmates breathe more confined and foul? And if *Iron rails*‡ were more generally adopted in the place of the heavy compound walls with pompous gates, habitations would be much more airy. *Large Tanks* upon an improved plan are much required all about Entally and Tiljullah, *as well as along the Circular Road generally*, and I have known in very dry seasons this want not only extremely distressing to the poor Natives, but to poor Christians also on *both sides* of the Circular Road, who have often complained to me how much they feel the want of this essential necessary of life. Such large Tanks would not only produce mould to fill up little cavities, dirty pools, and certain unnecessary ditches, but they would, if placed where four roads meet, tend greatly to make the place more airy. I think Bishop Heber describes Mirzapore, where there was a school and some Missionaries, as dreadfully unhealthy;§ the clearing since adopted has rendered that place very healthy; the Bishop also, I think, was told by his Sirkar how notoriously bad the Entally Nullah was, and that he never passed it without his handkerchief to his mouth.

The Natives where they reside make all their Tanks small, and as if it was intended that Malaria should be produced, they seldom fail to *plant trees round* their Tanks, so that you commonly see the surface of them quite green from the vegetation—this must have been remarked by every one; such are abundant about Entally, on the right and left side of the Balleegunge lines, and all down the Russapaglah road and Tolly's Nullah, and not less so in *Kidderpore*. I am of opinion that trees ought never to be planted upon the borders or banks of Tanks or Nullahs, for their leaves invariably find their way into the water, and lying upon the edge decompose, and go much more to produce the Malaria we complain of, than they can act as a safeguard or barrier to arrest the Malaria, as *supposed by some authors*, although I do not deny that large belts of trees at a sufficient (I mean, a considerable) distance from a City, and *properly* placed, may *perhaps* have such good effect, but such an opinion ought not to induce the plant-

* Sir Edward Hyde East strongly advised broad roads in the direction of the winds, and surface Draining instead of so many deep Drains as we have, which become stagnant. He thought the more superficial surface Draining properly managed, would keep the upper surface of the earth tolerably clear and dry. That part of Chowringhee behind the Theatre, and between that place and the Burying-ground, is acknowledged now to be much more healthy than it was before the new roads, Tanks, and buildings were made.

† Such a plan of building ought to be generally adopted in all low situations in Bengal.

‡ Since writing this, several houses have been thus improved; among them, three of the largest houses in Esplanade Row now are allowed to receive air, a clear breeze from the Maidán which was formerly shut out by high walls.—*August*, 1837.

§ Now an excellent Square, a good large tank with iron rails round the grounds, and Mrs. Wilson's School is in the corner of the Square. A large building is now erecting there by the General Assembly of the Scotch Church, for the education of Native youth, and the place is now acknowledged to be healthy.—*August* 1837.

ing-trees near a City, where they are certain to be injurious, not only by their leaves rotting, but by impeding the winds, and preventing the rays of the sun approaching the ground, which remains damp, and assists in the unwholesome decomposition. Such is the case in all the Jungle villages around Calcutta, and is evidently the cause of the great yearly mortality in them. All the gentlemen who have gone with me in my drives, agree in the positive statement, that, throughout India, they never met with such crowded green pools, Jungle, and bad smells, as abound around Calcutta every where in the Suburbs; and it should here be remarked as regards filthy pools, and Tanks, that they may not only be the cause of sickness by contaminating the air, but may affect the Natives who constantly bathe in them, as well as *drink* the *filthy* water of such Tanks; for in all probability, Malaria *may* become impregnated with water, and may thus be taken into the system by the skin or stomach.

For farther improvements, and removing impurities of air at this Presidency, the Draining of the Lake and cutting down the Jungle beyond it, I conceive to be of great importance. The Jungle all down to the Sea should be removed, if possible, and it would be a great advantage, if Excavations,* or Docks, were made here and there, on each side of the New Communication for ships and vessels to lie in, so as not to obstruct the passage of vessels to and fro. The face of the Lake may probably be materially altered. Ritchie, who surveyed the Soondurbuns in 1791, speaks of the well-known village of Tarda, which is marked on all the maps (as being on the borders of the Lake). This place is now about the same distance from the further borders of the Lake, as the distance is from the Balliaghat entrance, along the navigable Canal to its present furthest *borders*, on the South, *Bamanghatta*; therefore if Ritchie was correct, a very large portion (nearly half) of the Lake must have filled up naturally, for on each side of the river from Bamanghatta to Tarda, is thick low Soondurbun Jungle. *I imagine that upon the finishing the Canal now making, and its opening into the Hooghly, that the Lake will almost Drain itself*—as the low water of the river Hooghly is at times *lower* than the Lake at low water. Whether this Lake be Drained, or not, or either so partially Drained as to be fit only for rice cultivations, or otherwise warped by mud from the river, so as to be converted into garden ground, nevertheless, it is highly desirable for the general health, that not only the grounds on this side of it be cleared and improved, but that the Soondurbuns beyond it be removed as far from the capital as possible.



Letter to Sudder Nizamut Adawlut on the state of Grounds near the Insane Hospital, and generally throughout the Suburbs, pointing out the general Unhealthiness produced by their Jungly and Filthy state, with additional remarks made at a later period on the effects of the Inundations.—1828.

It will be seen that the number of Deaths in the Insane Hospital in these six months has been only 10, a number considerably less than has been usual during the same period for the last 12 years. It appears to me that this advantage has been produced by the making of four sunken and covered necessaries, the nuisance having previously been conveyed by an open Drain from the Hospital, and round the grounds.

* There has been a large Dock excavated near the Salt Works on this side of the Lake.—*8th June*, 1841.

† Such is the case now when the River is at its lowest, and the Flood Gates are allowed to be open.—*8th June*, 1841.

I have the pleasure also to report, that there has since been much less illness than usual, which I consider mainly attributable to the improvement and change above alluded to. I beg leave, however, to remark, that the grounds contiguous to, and outside of the Hospital premises, are in my opinion, a most unwholesome nuisance, particularly during the rainy season, the water not being Drained off, but lying in the various hollows, there stagnates; and corrupting all vegetable and animal matter it meets with, produces an atmosphere most unwholesome even to Natives, who are used to it.

There is also close to the entrance gate a Burying-ground, which brings together dogs, vultures, &c. which of themselves are a considerable nuisance, and upon which grounds the prisoners from the Jail of the 24-Pergunnahs are daily taken in a body for their necessary occasions. Were they to be taken nearer to the Nullah to which this ground adjoins, or elsewhere for such purposes, and the practice of burying discontinued at that place, it would be not only desirable, but would conduce to the healthiness of the Hospital.

While remarking on the state of the grounds near the Hospital, it may not be irrelevant for me to observe, that having for upwards of twenty years applied my attention particularly to atmospheric* causes of disease, and having now for several years been Surgeon of the Suburbs of Calcutta, I may not be going far, if at all, out of my line of duty, in pointing out, that I consider much of the unhealthiness of the Suburbs, as well as of Calcutta during and after the rains, to arise in a great measure from the state of the lands in the Suburbs immediately round about the Town, but more particularly in the Soorrah, Entally, and Balleegunge part of the Suburbs. The lands bordering upon these parts, especially to the Eastward, are not only more covered with Jungle and decaying vegetable matter than elsewhere, but in almost every part of them numerous irregular excavations are to be met with, made for brick-making, and for similar purposes. In these various holes and cavities impure air is generated by the decay and putrefaction of vegetable matter in water, and if impure air so produced is, as it is known to be, capable of causing fever and dysentery, it is not unfair to conclude that certain modifications of this Malaria may also be the cause of cholera, which disease predominates in those climates and soils in which fever and dysentery abound. That it may be so produced, is I think sufficiently obvious by the well-ascertained fact, that ship's crews in a state of perfect health and a considerable distance, even some miles from the shore, have, by a sudden land wind coming on, been fatally attacked by the scourge. A striking instance of this nature is recorded by Dr. Macculloch in his very valuable work lately published on the subject of Malaria, a work entitled to the particular attention of medical men and others in this country, which is so pregnant with this source of disease. I will here add, that I can name at this moment several families about Entally, where the whole family are laid up with fever, produced most indisputably by the impure air generated about their neighbourhood, by the decomposition or decaying of vegetable substances, and several are now removing up to Chinsurah and to other places, their removal being more conducive to their recovery than any medicine they can take, while they continue to breathe this atmospheric poison.

(Signed) F. P. STRONG,
Surgeon to Suburbs of Calcutta.

* I was emboldened in these remarks to the Suddur Nizamut Adawlut made in 1828, from the circumstance of my having been from 1805 to 1815, Surgeon to the Kent Dispensary; during these Ten years I was in frequent communication with the late Dr. Macculloch, who has written so much upon Malaria, and the above appointment, together with my private practice, gave me an extensive opportunity of judging of the correctness of that gentleman's opinions; and I knew well, some of the localities he alludes to in his work, and know his remarks to be quite correct.

These circumstances brought my attention to the subject of Malaria at an early period.—*August* 1837.

(Sd.) F. P. S.

A. 6.

Copy of the 9th Paragraph of F. P. Strong, Esq. Letter to the Medical Board, dated January 27th, 1834.

There are in more distant parts of the Suburbs, guards or depôts of prisoners, who are not so comfortably provided for as those in the Jails, and I have sometimes had occasion to remark upon their unhealthiness, particularly the one at Garden Reach*, which was situated in the midst of Drains, and from which five cases of cholera came into the Hospital in four days. The Nazir's guard, situated in Kidderpore, was so unhealthy in the last quarter of 1832, that fourteen cases of most malignant cholera came into the Hospital from that guard in less than a week, as was noticed in my Returns.

(Signed) F. P. STRONG.

A. 7.

Copy from the 9th Paragraph of a Letter from F. P. Strong, Esq. to the Medical Board, dated March 21st, 1835.

The same patients (alluding to the patients of the Native Insane Hospital) after being discharged apparently cured, coming into the Hospital again and again from obviously unhealthy localities, and other considerations connected with unhealthy situations which would embrace too much space to enter upon at large in this Report, tend to confirm me in my opinion, that in the climate of this part of Bengal, atmospheric Malaria, aided by the sudden variations in the temperature of the air, and consequent sudden check to perspiration,—by bad food, poverty, miserable clothing, and housing in huts crowded together in swampy filthy situations, with a want of cleanliness and ventilation,—by the habits of long fasting, and the use of impure water, (this being the usual mode of existence among the lower orders of Natives,) is highly calculated to produce diseases, which often ultimately end in insanity.

This general cause of disease which so much predominates in the Suburbs of Calcutta, I forcibly brought to the notice of the Sudder Nizamut Court in the year 1828. About this time I was requested to wait upon the Governor General, and I afterwards wrote several papers upon the subject to his Lordship, in which I entered into an explanation of what I conceived to be the principal causes of Unhealthiness in Calcutta, its neighbourhood, and the lower part of Bengal. In doing this, I was naturally led to make some remarks upon those great sources of Malaria,—the Salt Water Lake and the Jungly Soondurbuns

* A new Guard House for the prisoners has since been erected on a spot fixed upon by myself, and the executive Officers.—F. P. S. 8*th June* 1841.

adjoining, considering that the Draining of the one, and the Clearing of the other, would be a great Public benefit, if even done only with a view of removing such causes of Malaria, and consequent illness.

In some of the unhealthy spots, but particularly that broad belt of dense Jungle and ill-Drained ground, which exists from the Dum-Dum road, and is continued through Sealdah, Entally, Balleegunge, Bhowanipore, and down the Russapuglah roads, reside a vast number of people of all denominations connected with the City of Calcutta, and who are constantly suffering from illness, which I conceive might be, in a great degree, obviated by removing such evils by a proper system of large clean Tanks*, with no trees upon their banks ; raising the ground ; Regulations against Nuisances ; and good Draining. Were this, or some similar plan adopted, we should get air more fresh and free, and a healthiness would, I think, be obtained, that does not now exist.

In one of the papers I have alluded to, as having formerly written, I particularly mentioned that the year 1828 was a more healthy year than any I had known ; I did not then anticipate that the following years would have been so calamitous.†

The last five years, the period for which the Medical Board require to be furnished with the details before alluded to, have been unhealthy to a degree unheard of or unknown before, owing no doubt to the Inundations which have extensively existed to an unprecedented degree ; particularly in the four last years, an Inundation having occurred in each year, sweeping away a great part of the population between parts of the 24-Purgunnahs to the Southward of Calcutta and the Sea, and spreading over other lands to an enormous extent ; destroying the cattle, and the produce of the earth, which has not yet recovered from its effects. Most of the wretched Inhabitants, of these before populous districts, who were not drowned, fled towards our City, and several of these unfortunate beings became inmates of the Insane Hospital. One instance in particular, I would wish to be allowed to refer to, as it is a strong case in illustration of the deep distress that must have been felt ; and as exemplifying one of the causes of insanity.

The establishment at Gurriah-haut for affording them relief having been some time broken up, these poor unfortunate and starving wanderers were sent to my Hospital at Allipore, where I had frequently 60 or 80 of them at a time in Hospital. One poor woman was quite frantic ; she would not be comforted or silenced, and becoming obviously Insane, she was transferred to the Insane Hospital last December. There she would take no nourishment, she said the floods had robbed her of her children, and she died in a few days, of extreme exhaustion.‡

Three of these Inundations, in the lower parts of Bengal, to which I have referred, were from the Sea,§ and the other, the last, was produced by the overflowing of the Damoda river.

* At page 221 of Appendix D. to the Municipal Committee's Report will be found printed a Letter addressed by me to the Committee, on the subject of forming Tanks.—*8th June* 1841

(Sd.) F. P. S.

† The paper was written in July, 1829. For a short period, about the middle of the year 1828, there was a good deal of Fever in the Entally Suburbs, but the following twelve months were healthy. *August*, 1837.

‡ September 21st, 1833. I was asked by the Magistrate, Mr. Barlow, to suggest any means for arrangements,—so many prisoners and paupers being sick, he did not know how to lodge them,—to which, on the 22nd, I replied, that "if the paupers increased greatly, the old Bhowanipore guard, into which we put the Nazir's people, with evident advantage, might be available upon this occasion," and I recommended the removal of convalescent ulcers to the Jail, to make room for paupers in the Hospital, while the guard was getting ready.—*August*, 1837.

§ These Sea Inundations produced extraordinary mortality, so also did the Damoda Inundation ; but not by any means equal to those of the Sea. The discovery of a large proportion of sulphuretted hydrogen in the waters of the Estuaries and Coast of Africa, by Professor Daniell, is likely to lead to some useful results in the investigation of

These particular floodings, I mean the Sea and the Damoda river, are unfrequent when compared with the overflowings of the Ganges, which are more frequent, and seldom attended with equally serious consequences. It will be seen, by a reference to the Transactions of

the nature and causes of Miasmata arising from Inundation of the Sea. The presence of sulphuretted hydrogen in water is easily detected by the brown colour of the precipitates afforded by nitrate of silver, and by acetate of lead; but for purposes of investigation, the gas should be collected, and its quantity in a given portion of water, accurately ascertained in all situations in which Miasmata on the Sea coasts prevail. It is worthy of remark, that some facts recently brought to light, give reason to believe, that the mortality on the Coast of Africa may be caused, or is certainly much *increased* by the exhalations of the Sea water, which in some instances, contains more than eleven cubic inches of sulphuretted hydrogen in a gallon. Now when it is considered that so small an admixture as one-fifteen-hundredth part of this deleterious gas in the atmosphere acts as a direct poison upon all animals, it is difficult to believe that it does not aggravate, if not *directly originate* disease on those coasts where it abounds.

Professor Daniell feels convinced, that the evolution of sulphuretted hydrogen is intimately connected with the unhealthiness of such stations, and he alludes to the sufferings described by the traveller, Macgregor Laird, whose illness occurred in the very locality from which some of the waters, which the Professor examined, were taken; and he mentions that the test of a little solution of the sulphate of copper will detect its existence, and adds, that the contact of chlorine with sulphuretted hydrogen, instantly effects its decomposition, and renders it perfectly innoxious. He refers to the 19th vol. of the Annales de Chemie, p. 225, to shew that the worst cases of Malaria are connected with the decomposition of the sulphates in Sea water; and has shewn in the most satisfactory manner, that by excluding the Sea from certain extensive Marshes, there were no appearances in the following year of the terrible maladies which had appeared every year previously from the mixture of Fresh and Salt Water, which in summer was rarely changed, and becoming corrupt, spread infection over the neighbourhood, of the most destructive kind. Professor Daniell, in a letter to Capt. Washington, R. N. gives the following results of some experiments on the action of Sea water upon decomposed vegetable matter; and also a simple mode for fumigation by Chlorine, to obviate the bad effects of this poison.

To CAPTAIN WASHINGTON, R N.

My dear Sir,

As any confirmation of my idea, that the unhealthiness of the African coast is dependent, in a great degree, upon the evolution of sulphuretted hydrogen, is calculated to give confidence to those who are about to start upon the Expedition to the Niger, from the certainty of the means of counteraction within our power, I hasten to communicate to you the result of an experiment which certainly determines the origin of that deleterious gas to be the re-action of vegetable matters upon the sulphate of soda in Sea water.

On the 2nd of November last, I placed a quantity of newly-fallen leaves in three glass jars capable of holding about 1½ gallon of water.

No. 1. Upon the first I poured about a gallon of New River water.

No. 2. Upon the second I poured about the same quantity of the same water, in which 3 ounces of common salt had been dissolved.

No. 3. Upon the third, the same quantity of water in which three ounces of crystallized sulphate of soda had been dissolved.

The three jars were then placed in a warm chamber, the temperature of which varied from about 70° to 110,° and the water was filled up from time to time, as it evaporated, and the mixture well stirred.

Upon examining them yesterday, the following was found to be the state of the jars.—

No. 1. Had a very disagreeable odour, but produced no change whatever upon paper soaked in acetate of lead.

No. 2. Was perfectly sweet, and possessed, indeed, a rather agreeable odour. It produced no effect, of course, upon the test paper.

No. 3. Had a most insupportable sickening odour, much worse than that of pure sulphuretted hydrogen, and instantly blackened paper soaked in acetate of lead, throwing down sulphuret of lead with a metallic lustre.

If you, or any of your friends, would like to see the experiment in its present stage, it would give me the greatest pleasure to show it.

Now, for all this, chlorine fumigation is the certain remedy, and I have taken the liberty of sending you herewith some Memoranda for conducting the process, with the earnest hope that they may be useful to the Expedition.

I remain, &c.
J. F. DANIELL.

King's College,
5th February, 1841.

the Physical Class of the Asiatic Society, page 260, part 1,—" That an Inundation of the Sea, or of the Damoda river, is supposed not to happen oftener than once in a Century." That remark is in allusion to the dreadful Inundation in 1823; and I can find no other account of any Sea Inundation, except the eventful one of nearly a Century ago, which happened in the night, between the 11th and 12th October, 1737, to be found in the Gentleman's Magazine 1738-9: besides great damage to shipping and boats, 3,00,000 souls are said to have perished.

I know of no written record as to the effect of this Sea Inundation upon the health of the Inhabitants, although it was an event sufficiently remarkable to be handed down from father to son; and I have met with old Natives who have heard of it from their fathers. But of the late Inundations which I allude to, their effects are so generally known, that it is unnecessary for me to dwell upon them, although I may be allowed to add, from inquiries I have made, that these effects have not been confined to the poor alone, but that landholders of respectability, and their families, have been carried off by disease, and this over a vast extent of populous country, and particularly so in parts bordering on our South and South-east Suburbs of Calcutta; and great numbers of these Zemindars who fled to Bhowanipore, and to this City for change of air and Medical attendance, died of the diseases produced in their Villages. In corroboration of what I have stated as to the general unhealthiness produced by the Inundations, and the consequent impure atmosphere, I beg leave to mention a few particular examples which I have learnt. One Native gentleman of wealth assures me, that his property has been greatly increased by the numerous deaths in his family; and another old gentleman has often enumerated to me the dreadful mortality, which has deprived him of all those relations of his, who lived beyond Gurriah-haut, about Barriepore. Another Native who is Interpreter to the Mysore Princes, named Nilcomul Bonnerjee, who resides at Bhowanipore, writes me that his wife a few days after the Inundation of 1833, went to her father's at Barro, a village three coss South of Barriepore, in a pregnant state, and found two, three, and four persons die every day at each house; that they wanted hands to bury the dead; that in two or three days her mother, brother, aunt, uncle, and nine near relations died; she was confined, and there was no one to look after her. The writer on hearing this, sent three women and four servants, they all returned ill to his

Memoranda for Fumigation by Chlorine.

One part by weight of common salt, and one part of the black oxide of manganese are to be acted upon by two parts of oil of vitriol, previously mixed with one part, by weight, of water (9 measures of acid, 10 of water,) and left till cold. Such a mixture will immediately begin to evolve chlorine at a temperature of 60°, and continue to do so for four days in a gradual manner, without the application of any extraneous heat

The vessels in which the mixture is made may be flat pans of any common earthenware.

3¼ lbs. of the mixed salt and manganese, with 4¼ lbs. of the mixed acid and water, are calculated to yield 5¼ cubic feet of chlorine.

In suspected situations it would be desirable to have one or two charges of 3¼ lbs. of the salt and manganese placed on the windward side of the deck, to be renewed on every fifth day.

It is, however, impossible to give directions for the exact quantity, the object being to preserve an atmosphere smelling of chlorine, but not sufficient to produce any irritation of the lungs, or coughing.

Between the decks this kind of fumigation would be too strong; but pans containing chloride of lime and water would be sufficient protection:—the solution, however, should be frequently renewed.

A charge of the chlorine mixture would be very advantageously placed in the hold, if it were to be found not to produce any serious annoyance. It should also be remembered, that there is nothing injurious in the odour of chlorine, provided it be not in such excess as to produce coughing.

J. F. DANIELL.

KING'S COLLEGE,
5th February 1841.

(*Sd.*) F. P. S.

CALCUTTA,
8th June 1841.

residence, and with exception of his wife and child, they all died in a week. Ever since his wife has been ill with fever and spleen until lately cured. He states, that at this time the number of children daily sold by destitute parents in the 24-Purgunnahs is enormous.

I have a letter before me, signed by the old gentleman; he writes—"In confirmation of the truth of Nilcomul Bonnerjee's letter, I can say that I had thirty relations residing in the neighbouring villages in 1832-3: only one boy is now living, but ill with spleen, out of all these relations. A great number of respectable families suffered, as Cossinauth Mullick, Bhagwan Chowdry, and others of opulence and respectability. The first and twenty others, (being the whole of his family,) all died except one girl; and the last and about eleven in family, all are dead but one boy, who ran away to his uncles. This misfortune was almost universal."

It would not be difficult to add many similar examples, all equally proving the wide-spread devastation and death caused by the flood and the impure atmosphere; and I have given the above information in the same detailed manner as I have heard it, to shew the vast extent of general mortality. Many must have been lost in obscurity; for when we see families possessing the necessaries and comforts of life suffering to so great an extent, it may readily be conceived, how great must have been the sufferings of the poor, abject, and starving.

(*Signed*) F. P. STRONG.

NOTE.—Both these places, referred to in the above extracts, are now much improved.—*29th August*, 1837.
(*Sd.*) F. P. S.

A. 8.

Letter from F. P. Strong, Esq. dated 4th October 1830, to Major Benson, returning the late Dr. Buchanan's Papers, and sending, for the information of the Governor General, some Papers written by Capt. Jenkins.

To MAJOR BENSON,
Military Secy. to the Governor General.

MY DEAR SIR,

Pray accept my best thanks for the Papers on the means of promoting the Health, Comfort, and Convenience of the Inhabitants of this City, which I now return with many apologies for keeping them so long. Not trusting my own judgment regarding the nuisances of the Town, I sought the opinion of Captain Jenkins, who has written some Papers on several of the Nuisances, and proposed to remedy some, and with his permission I enclose them for the perusal of the Right Honorable the Governor General. I will only in this place, venture to express a hope, that when the new Eastern Canal is finished, that the levels of Calcutta will be efficiently taken, and something in the way of Draining the Town done.

Regarding the Suburbs, the paper marked No. 21,* exhibits a deranged state of things, similar to what now actually exists. Many of the recommendations there suggested to Drain and Level the Grounds about Kidderpore, where the stagnant water is represented as being injurious to persons residing in that neighbourhood, and on the grounds both on the right and left of the Allipore road, just beyond the bridge, now particularly apply. It is also there stated, that the grounds behind the General Hospital had been represented as having been injurious to the Invalids in Hospital; a road is proposed to be made from this part towards Bhowanipore, or the Russapaglah road; and one crossing this from near the Hospital, Southward to Kalighaut; and it is remarked that these roads would be of material consequence to the Natives. A Cut also from Telly's Nullah behind the General Hospital is suggested. If such Cut or Canal were made to join the New Eastern Canal, now nearly finished, in the North-eastern division of the Suburbs, it would of course be extremely desirable for the Drainage of Chowringhee, and all that part of the City; the bad state of Drainage, Jungle and Swamps throughout the Suburbs, and particularly down the Russapaglah road, I have already brought to the notice of the Governor General. and must not now intrude further upon his Lordship's valuable time, but subscribe myself, with many thanks to you.

* Referring to Dr. Buchanan's papers returned by Dr. Strong, to Major Benson.—J. M.

Yours, &c.

4th October, 1830. *(Signed)* F. P. STRONG.

A. 9.

Letter from MAJOR TAYLOR, *calling on* F. P. STRONG, ESQ. *to attend a Committee at the Government House on Draining Calcutta, the Lake, &c.*

TO DR. STRONG.

MY DEAR SIR,

The Governor General has desired me to request you to meet the gentlemen named in the margin† at the Government House on Tuesday next, at half-past two o'clock P. M. for the purpose of considering the Drainage of Calcutta in connection with the present Circular Canal, and the project of extending it round the Salt Water Lake into the deep water channel at Bhamunghatta, together with the Drainage and Silting up of the Salt Water Lake.

GOVT. HOUSE, Yours, &c.
27th December, 1834. T. W. TAYLOR.

† D. McFarlan, Esq.
R. D. Mangles, Esq.
Capt. Steel,
Dwarkanath Tagore,
Col. Galloway,
—Hosgason, Esq.
J. Kyd, Esq.
Capt. Fitzgerald,
Ramcomal Sein,
Col. Tickell, C. B.
J. R. Colvin, Esq.
J. Prinsep, Esq.
Capt. J. Thomson,
Capt. Forbes,

A. 10.

Letter from F. P. Strong, Esq, to Mr. Mangles, transmitting some Papers.

To R. D. MANGLES, ESQ.
Secretary to Government of Bengal.

Sir,

It affords me considerable pleasure to observe, that the Medical Topography of this City, and its Suburbs, is exciting attention; and as it is likely that this subject in connection with the Fever Hospital may be brought before the Government, I feel it in some degree incumbent on me, from the situation I hold, to forward to you, to be laid before Government, whenever the subject may be brought to their attention, some papers, shewing that so long ago as the year 1828, I had addressed the Sudder Nizamut Adawlut, as well as the Right Honourable Lord William Bentinck, and on a later occasion, the Medical Board, upon the same subject; and it will give me great satisfaction to find, that some *active* measures of Improvement result from the present discussion.

Calcutta,
June, 1835.

I am, &c.
(Signed) F. P. STRONG.

A. 11.

Letter from Mr. Mangles, acknowledging the receipt of the above Papers.

To Dr. F. P. STRONG,
Assistant Surgeon of the 24-*Purgunnahs.*

Sir,

I am directed by the Honourable the Governor of Bengal, to acknowledge the receipt of the interesting Papers to which your letter of the 18th instant gave cover, and to assure you, that your opinions will not be overlooked when the matters to which they relate come under the consideration of Government.

I am, &c.

Fort William,
The 23rd June, 1835.

(Signed) ROSS D. MANGLES,
Secretary to the Government of Bengal.

A. 12.

Census of the Population in the Suburbs of Calcutta.

Names of Thannahs.	No. of Villages.	No. of Mehals.	Resident Hindu Adults.	Hindu Children.	No. of Hindus in Service.	Resident Mussulman Adults.	Mussulman Children.	No. of Mussulmans in Service.	Native Lodgers or Passengers.	European Adults.	European Children.	East Indian Adults.	East Indian Children.	Total Inhabitants.
Thannah Sulkeah, ...	132	258	33,223	20,342	*8,106	12,154	4,395	*2,019	3,153	43	24	63	49	73,446
Ditto Chitpore, ...	8	33	14,177	5,286	984	1,627	601	199	875	23	7	53	1	22,650
Ditto Manicktulah, ...	31	42	20,627	6,173	30,100	13,201	9,661	3,098	3,883	441	67	759	123	54.935
Ditto Tauzeeraut, ...	29	84	22,032	5.349	1,120	8,601	2,755	647	5,072	54	15	45	27	43,950
Ditto Nowhazaree, ...	1	28	8,465	2,689	799	5,845	2,214	987	2,818	63	3	50	65	22,212
													Grand Total,	2,17,193

* The columns are not included in that of the Total

A. 13.

Abstract Statement of Deaths among the Native Inhabitants of the City of Calcutta during the following years, shewing the number per Month, the Grand Total, and the average rate per cent. as per last Census.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September	October.	November.	December.	Grand Total.	Average per cent. per last Census.
1831	No. Returns.		179	456	342	325	384	463	589	682	1,067	753	5,240	2·90
1832	880	571	691	637	754	511	616	739	885	951	988	1,065	9,308	4·28
1833	1,167	1,170	1,519	1,710	1,209	683	898	1,088	1,657	1,788	2,449	2,185	17,523	8·07
1834	1,068	732	891	1,326	1,296	589	958	1,224	983	1,198	1,564	1,238	13,067	6·02
1835	867	624	683	662	673	492	633	568	676	771	870	593	8,112	3·78
1836	637	535	680	692	628	600	628	733	638	770	713	641	7,895	3·63
1837	652	562	631	661	725	1,034	733	763	661	645	669	728	8,464	3·89
1838	674	721	1,651	2,389	1,434	549	487	632	663	628	767	798	11,393	5·24
1839	606	599	577	604	465	484	588	594	502	756	851	1,349	7,975	3·67
1840	1,326	1,356	1,349	1,095	854	555	746	807	834	706	1,101	1,001	11,730	5·40
	7,877	6,870	8,851	10,232	8,380	5,822	6,671	7,631	8,088	8 895	11,039	10,351	1,00,707	4 64 - PerAnnum

A. 14.

Mortality among all Classes in Calcutta for 20 years, but for the Native Population only 8 years.

Years.	Protestant	Burials.	Catholic Burials, D. Rozario.	Catholic Burials, Boitockanah.	Greeks.	Armenians.	Indo-Armenians.	Native Christians.	Natives.	
1817	216	Scotch burying-ground began 1826.	313	169	4	10	3			
1818	272		211	159	2	20	3			
1819	275		284	158	0	23	3			
1820	281		282	136	0	17	1			
1821	246		277	172	0	16	3			
1822	324		294	140	0	16	2			
1823	270		277	156	0	10	2			
1824	278		282	188	0	21	1			
1825	297		285	154	1	12	10			
1826	275		309	145	2	19	17			
1827	254	11	308	174	0	15	16	4	Native Deaths for 8 years.	
1828	256	19	250	170	2	15	12	3	Hindu, ... 8,299	9,308 in 1832.
1829	184	21	209	146	3	12	16	2	Mussulman, .. 1,009	
1830	224	26	236	138	1	14	15	0	Hindu, .. 15,138	17,523 in 1833.
1831	186	29	236	122	3	17	19	8	Mussulman, .. 2,385	
1832	217	25	269	121	1	17	16	1	Hindu, .. 11,167	13,067 in 1834.
1833	302	30	288	204	2	23	14	5	Mussulman, .. 1,900	
1834	281	35	257	199	2	16	17	4	Hindu, ... 6.873	8,102 in 1835.
1835	233	18	233	115	1	7	16	4	Mussulman. .. 1.229	
1836	197	26	188	104	0	15	13	3	Hindu. 6,366	7,881 in 1836.
									Mussulman, ... 1,515	
	5065	240	5288	3070	24	315	199	34	Hindu, ... 7,097	8,464 in 1837.
									Mussulman, .. 1,367	
	20	10	20	20	12	20	20	9	Hindu, ... 9,802	11,316 in 1838.
									Mussulman, ... 1,514	
Avg.	253	24	264	153	2	$15\frac{3}{4}$	10	$3\frac{4}{5}$	Hindu, ... 6,570	7.975 in 1839.
									Mussulman, .. 1,405	

A. 15.

Statement of the Mortality per cent. among the different Classes of Inhabitants in Calcutta per Census and Tables of Mortality for 5, 8, 10, 20, and 23 years.

Denominations.	Population per Census.	Mortality per Tables of Mortality and Registers of Burials. For 5 years, ending 1836. Died Annually.	For 5 years, ending 1836. Per Cent. per Annum.	For 10 years ending 1836. Died Annually.	For 10 years ending 1836. Per Cent per Annum.	For 20 years ending 1836. Died Annually.	For 20 years ending 1836. Per Cent. per Annum.	For 1837. Died.	For 1837. Per Cent.	For 1838. Died.	For 1838. Per Cent.	For 1839. Died.	For 1839. Per Cent.	Average Mortality of the several classes and periods ascertained. For 8 years. Died Annually.	For 8 years. Per Cent. per Annum.	For 13 years. Died Annually.	For 13 years. Per Cent. per Annum.	For 23 years. Died Annually.	For 23 years. Per Cent. per Annum.	General Mortality of Calcutta as far as ascertained. Died Annually.	General Mortality. Per Cent. per Annum.
Christians, Scotch Burials,		..	..	24	..	..	..	34	..	40	..	45	..	..	..	35¾	..	..			
	7884	..	..	..	..	..	3·51	..	3·34	..	5·43	..	3·94	..	..	..	..	..	3·55		
Protestant.		..	..	..	..	253	..	230	..	231	..	265	..	..	..	..	..	244¾			
Catholics, Principal Church,		..	..	..	..	264	..	251	..	266	..	233	..	..	...	..	..	253¼			
	3341	..	..	..	..	..	12·48	..	10·56	..	11·64	..	9·18	..	..	..	..	..	10·97		
Ditto, Boitockanah Church,		..	..	..	..	153	..	102	..	123	..	74	..	..	..	..	..	113			
Armenian, ..		..	..	..	..	15	..	23	..	15	..	20	..	..	..	..	..	18¼			
	636	..	..	..	..	..	3·93	..	4·87	..	4·56	..	4·56	..	..	..	..	..	4·48		
Indo-Armenian, ...		..	..	..	..	10	..	8	..	14	..	9	..	..	..	..	..	10¼			
Total Christians, ...	11,861	..	..	24	..	695	6·06	648	5·46	689	5,81	646	5.44	..	..	35¾	..	639¾	569		
Mahomedans, ...	59,622	1607	2·69	..	..	..	..	1367	2·29	1514	2.53	1405	2·35	1473	2·47	...	..	..	..		
Hindoos, ...	1,57,418	9569	.6·7	..	..	..	..	7097	4·50	9802	6·22	6570	4·17	8260	5.24		..	...	..		
Total of all Classes, ..	2,28,901	11,176	+	24	+	695	5·20	9112	3·98	12005	5.24	8621	3·76	9733	×	35¾	×	639¾	..	10,408½	4·54

A. 15.—*Continued.*

Proportions.

Census.

	Catholics	Protestants	Mahomedans	Hindoos
Mahomedans, 1 to				$3\frac{2}{3}$
Protestants, 1 to			$7\frac{1}{2}$	20
Catholics, 1 to		$2\frac{1}{3}$	18	$47\frac{1}{8}$
Armenians, 1 to	$5\frac{1}{4}$	$12\frac{1}{3}$	$93\frac{3}{4}$	$247\frac{1}{2}$

Annual Mortality.

	Protestants	Armenians	Hindoos	Catholics,
Hindoos, 1 to				$1\frac{5}{6}$
Armenians, 1 to			$1\frac{1}{3}$	$1\frac{5}{11}$
Protestants, 1 to		$1\frac{2}{9}$	$1\frac{6}{9}$	$3\frac{1}{12}$
Mahomedan, 1 to	$1\frac{5}{12}$	$1\frac{5}{6}$	$2\frac{3}{8}$	$4\frac{5}{12}$

A. 16.

Abstract Statement of Deaths, among the Prisoners of the Allipore and Russapaglah Jails, and different Guards in the 24-Purgunnahs, during the following years, shewing Number per Month, the Grand Total, and the Average rate per cent.—1711 1/20 being the average Number of Prisoners throughout the period; more than two-thirds of those are Prisoners for life, the rest temporary, like all other Zillah Prisoners; shewing the three months of greater Mortality to be the cold weather months, as in Calcutta.

Years.	January. No. of Prisoners.	January. No. of Deaths.	February. No. of Prisoners.	February. No. of Deaths.	March. No. of Prisoners.	March. No. of Deaths.	April. No. of Prisoners.	April. No. of Deaths.	May. No. of Prisoners.	May. No. of Deaths.	June. No. of Prisoners.	June. No. of Deaths.	July. No. of Prisoners.	July. No. of Deaths.	August. No. of Prisoners.	August. No. of Deaths.	September. No. of Prisoners.	September. No. of Deaths.	October. No. of Prisoners.	October. No. of Deaths.	November. No. of Prisoners.	November. No. of Deaths.	December. No. of Prisoners.	December. No. of Deaths.	Grand Total of Prisoners.	Grand Total of Deaths.	Average Number of Prisoners.	Deaths per cent.
1820	1,833	30	1,903	13	1,996	20	1,921	16	1,940	16	1,831	9	1,807	16	1,821	9	1,700	11	1,705	13	1,681	10	1,750	16	21,888	179	1,824	9·81
1821	1,816	17	1,809	10	1,832	11	1,927	12	1,974	11	1,995	7	1,894	10	1,778	16	1,772	20	1,762	9	1,759	24	1,762	20	22,080	170	1,840	9·24
1822	1,795	18	1,805	7	1,879	13	1,799	11	1,848	4	1,851	3	1,889	9	1,681	11	1,612	11	1,597	20	1,571	9	1,544	14	20,871	130	1,739	7·47
1823	1,629	11	1,644	10	1,595	10	1,593	7	1,635	6	1,571	10	1,511	10	1,416	12	1,386	10	1,404	14	1,394	9	1,385	9	18,163	118	1,514	7·79
1824	1,481	6	1,529	11	1,496	9	1,375	6	1,403	8	1,328	11	1,228	7	1,243	7	1,29[illegible]	11	1,295	3	1,491	4	1,559	4	16,698	87	1,391	[illegible]·25
1825	1,599	6	1,498	10	1,431	17	1,463	18	1,249	17	1,187	8	1,139	9	1,151	13	1,051	15	1,173	8	1,122	12	1,088	7	15,154	140	1,263	[illegible]·08
1826	1,117	7	1,137	4	1,138	2	1,161	3	1,129	14	1,142	6	1,148	6	1,138	7	1,157	3	1,177	6	1,113	3	1,140	6	13,697	67	1,141	5·87
1827	1,179	6	1,212	4	1,116	7	1,153	7	1,226	15	1,232	1	1,295	2	1,304	5	1,210	7	1,271	8	1,242	6	1,198	5	14,641	73	1,220	5·98
1828	1,227	11	1,153	7	1,260	23	1,299	11	1,338	7	1,304	5	1,287	8	1,298	3	1,327	3	1,287	6	1,365	6	1,309	10	15,451	100	1,289	7·76
1829	1,327	15	1,289	4	1,376	6	1,33[illegible]	12	1,395	6	1,386	5	1,434	8	1,466	5	1,386	6	1,459	3	1,487	4	1,886	12	17,221	86	1,435	5·99
1830	1,486	3	1,552	6	1,457	8	1,497	4	1,536	6	1,536	10	1,564	6	1,573	10	1,566	8	1,553	23	1,521	29	1,889	21	18,730	134	1,561	8·58
1831	1,474	19	1,575	10	1,586	11	1,651	9	1,632	16	1,619	11	1,635	7	1,615	11	1,545	12	1,531	29	1,945	29	2,081	23	19,893	187	1,658	11·27
1832	2,219	23	2,013	7	1,924	22	1,909	11	1,941	10	1,984	6	2,227	4	2,047	11	1,706	12	1,964	19	2,153	24	1,9[illegible]9	27	23,999	176	2,000	8·80
1833	2,067	12	2,119	13	2,372	28	2,170	11	1,918	7	2,117	7	1,982	11	1,991	21	2,037	23	2,217	37	2,087	33	2,209	29	25,285	231	2,107	10·96
1834	2,322	18	2,807	9	2,317	13	2,154	14	2,147	9	2,111	10	1,988	14	1,872	16	1,879	17	1,896	28	1,785	19	1,913	22	25,191	189	2,099	9·01
1835	2,109	23	2,158	7	2,211	11	2,037	13	2,035	11	2,225	9	2,118	6	2,013	8	2,002	9	1,843	7	1,836	7	1,883	10	24,500	124	2,042	6·07
1836	1,806	8	1,776	5	1,720	3	1,894	9	1,829	6	1,736	7	2,163	7	2,024	11	1,869	8	1,873	12	1,706	13	1,876	11	22,272	100	1,856	5·38
1837	2,021	10	1,928	3	1,953	9	1,947	4	1,982	8	1,981	15	1,912	8	1,916	8	1,939	6	1,938	8	1,961	12	2,048	10	23,529	101	1,961	5·15
1838	2,025	8	2,046	7	2,159	8	2,143	11	2,121	12	2,203	10	2,237	9	2,191	9	2,221	12	2,160	11	2,155	13	2,165	19	25,826	129	2,152	5·99
1839	2,215	10	2,212	12	2,130	8	2,089	13	2,109	8	2,187	16	2,125	5	2,170	6	2,217	5	2,179	11	2,175	16	2,062	19	25,800	129	2,150	6·0
	34,747	261	35,224	159	34,881	239	34,512	202	34,[illegible]90	200	34,489	166	34,526	161	33,758	202	32,872	209	33,284	275	33,553	282	31,656	294	4,10,892	2,650	34,241	7·75
Percent. p. annum	1,737	904	1,761	539	1,744	820	1,726	701	1,719	700	1,724	574	1,726	562	1,687	717	1,643	761	1,664	991	1,677	1007	1,732	1016			1,712	

No. III.

Letter from F. Pemble Strong, Esq. dated 17th February, 1838, on the subject of forming Tanks.

To WILLIAM COBB HURRY, ESQ

Secretary to the Municipal Committee.

Sir,

I have the honour to acknowledge the receipt of your letter of the 10th instant, and feel flattered that the Committee of Municipal Inquiry consider the Papers* on Topography of use. In these Papers, I had, in that part which relates to the comparative mortality of Europeans, in my general Tables of Mortality for Calcutta, annexed to my Topographical Papers, purposely left out the Soldiers in the Fort, as well as the Sailors belonging to the Merchant Ships of this Port, because their numbers vary, and they cannot be considered as actual residents; the addition of them therefore to the number of European residents, would not only have rendered the subject of mortality more difficult than it at present is, but would have presented a ratio of mortality amongst the settled Europeans higher than it is in reality. In this latter class, the proportionate mortality might naturally be expected to be less than amongst a class of men such as Soldiers, and especially Sailors, whose habits and mode of living, expose them more to effects of climate, than the ordinary European Inhabitants.

2. Finding inquiries made as to the best mode of making Tanks, I am led to suppose the Municipal Committee contemplate the excavation of such reservoirs of water in localities most desirable for the convenience of the public, and as I have on a former occasion examined the soils about Calcutta and its neighbourhood, it is possible that what I have to offer upon the subject of Tanks, may be considered of some utility.

3. I believe it will be found that the soil generally is of such a nature that if Tanks are properly constructed, they may be made to retain the rain water from year to year, without the necessity of introducing river water into them.

4. The upper soils are found almost universally to be very sandy, and calculated to allow the water to escape from the Tanks by percolation; but if the clays which fortunately for Calcutta are sufficiently near the surface to form the beds or floors of Tanks, were dug down to, as they lie on an average at about 22 feet deep, and the same clays, a little modified, used to line the sides of the Tanks as high as their upper margins, it seems to me probable that this lining (or puddling) would, if properly performed, prevent such percolation, whilst it would also prevent the admission of any impure or brackish water from the interior of the soil into the Tanks, which I conceive often renders their water somewhat analogous to the well water, which is every where more or less brackish from its infiltration through the earth, and particularly through the stratum of sand, which is a little above the clays.

5. I think I am borne out in this view of the subject, by the nature of the soil, as

* Published in the Quarterly Journal of the Medical and Physical Society of January, 1838.

ascertained in the following experiments which I refer to as the result of certain borings I formerly made in the line of the Circular Road, on each side of the Maharatta Ditch, and to the Eastward, on the Western margin; as well as in various other parts of the Salt Water Lake, with a view to ascertain the nature of the soil.

6. I will begin with the boring at the Baug Bazar Bridge, when the soil was being removed for the present Circular Canal. The Canal labourers had dug a well 21 feet deep from the floor or bottom of the Canal. The whole depth of this well was entirely clay, very compact, and slate-coloured; the augur was applied to the bottom of this well, and continued to bring up a similar kind of clay, in part of which was mixed a good deal of peat earth, very black, and capable of being burnt. This clay continued to the depth of 96 feet from the floor or bottom of the Canal. At 93 feet we seemed to have tapped a spring, for the rods suddenly dropped two or three feet without the least pressure or moving round, into strong sandy and reddish gravel, and, on withdrawing them, up rushed a column of water which filled the shaft of the well in five minutes, and flowed over the wooden platform on the top of the well, with so much force, that we had great difficulty in stopping it, though the platform was embedded in the clay, and had only a hole in the centre, sufficiently large to admit the rods with a small augur. A quantity of very tenaceous clay, which had been excavated in making the well, was close by, and with this we thought we had stayed the flow. With a view to ascertain how high this water would rise in a tube, we put one of wrought iron down; which not being quite water-tight, failed; and the following morning, early, the late Mr. Kyd, and myself conveyed a long leaden tube to the spot, but we found the water had broken through, and so filled the Canal, that the labourers upon that work had found it necessary to remove our Gin, &c., and we of course were obliged to give up this operation.

7. This experiment in some degree corresponds with the boring which I had previously made about the centre of this Canal, three miles from this spot at Sealdah; with this difference, however, that the clay at the latter place, Sealdah, was extremely tenaceous, and of a bright yellow colour; and, instead of the water rising from 96 feet, it rose from a depth of 50 feet from the platform at the bottom of the Canal, or 70 feet from the surface. Here there was no well, but we bored in clay nearly the entire depth, and so stiff was it that two large Europe-made iron hooks were broken in extricating the rods from out of it. No water appeared till reaching the depth of 70 feet, but at this depth the water overflowed into the Canal with much force. Its purity was doubtful, but in the boring at Baug Bazar, the water was entirely sweet. It is therefore difficult to say, whether, at the latter place, the water came from the river, or from an artesian spring, such as we are in search of.

8. On this boring I have remarked, at page 50 of my Topography, as the result of my observation at that time,—April 23rd, 1829, "That in digging Tanks no object is to be gained by making them of extraordinary depth, under the expectation of meeting with springs of fresh water, but that they must be considered rather as reservoirs for rain water;" and every experiment since has led me to believe that the Calcutta Tanks are not supplied by springs but by rain water, which Drains into them from the surface, and oozes through the sandy stratum which is above the clay. From the latter source, particularly, much brackish and impure water is admitted. If, in making new Tanks, the stiff clay, which is quite impervious, be dug down to, and then made to form the bed of the tank, I do not conceive that this clay would mix or unite with the water to make it impure, like the water that passes through the saline upper soils, and which might be prevented percolating through the sides of the tank by properly puddling them with some of the same clay, a little modified.

9. As for the Tanks Draining the water from the surrounding soils, I submit that there is porous earth enough every where to take those waters off.

10. The bottom of the Tanks then having an impervious stratum, if the sides be properly puddled or lined, the only consumption of the rain water from these Tanks will be by evaporation and use.

11. By this means a quantity of this valuable article will be retained in these reservoirs which is now lost, and besides the purity of the fluid itself being preserved, the poorer classes of our Native subjects would have an abundance, where now they have only a scanty supply, and that of the worst description.

12. Should it still be found necessary to resort to Tanks for water for the roads, some of the present reservoirs might be set apart especially for the purpose, and they might be filled from the river when occasion required.

13. To shew that at no great depth stiff clay abounds in all directions, quite applicable to the purpose of forming impervious floors to Tanks, and which if not of itself, yet, when mixed with other materials, such as are used for lining (or as it is called, puddling) the sides of Canals in Europe, is calculated to line or puddle our Tanks here, I beg to append a series of experiments made by me in continuation of my borings.

14. In a garden on the Calcutta side of the Circular Road, between the Durrumtollah and the Burying Ground, I found the usual layer of peat earth and stiff clay within the range of tank-making, and in this clay, at the depth of 70 feet from the surface, hard and large pieces of conker. The difficulties we met with at this depth were so great that we were obliged to abandon the experiment.

15. About two miles Eastward of this last boring, and the one at Sealdah before alluded to, which are nearly two miles apart, I bored in ground near the margin of the Lake, again at the distance of two miles, to the depth of forty feet, and in both cases, soon came to the same charred, peaty earth, and stiff clay. About a mile more Eastward within the Lake, on the banks of its navigable channel, the same appearance, to the depth of forty feet, presented itself. I now entrusted the further operations on the Lake to a man I could depend upon, who took the coolies I had hired for the purpose, to the Northern division of the Lake towards Dum-Dum ; also to the Eastern parts, and to the Southward as far as Bamaunghatta. They brought me from all the different borings samples of earth of the same kind as I have described, with this exception, that towards Bamaunghatta the earth was a little more sandy, and that brought from Tardah, five miles beyond the Lake, was perhaps yet more so. I have since examined the soil at the Salt Works now making, five miles beyond and South of Tardah, and found there still less clay and more sand. Indeed so much does the siliceous soil predominate, that the embankments are with difficulty made at this place ; while on the other hand, the clay so abounds on the Calcutta, or Western side of the Lake, that the bunding of the Salt Works at Balliaghaut was effected with ease, and the excavations now making on 150 bighas of Lake ground as a dock to contain 200 river craft, shew a superabundance of excellent clay near the surface in all directions, and from this spot there is now an excellent embankment formed, which is continued nearly half through the Lake.

16. For information upon the subject of puddling, I would refer to Loudon's Encyclopœdia of Agriculture, 2nd edition, page 620, article 3824, and for further information, that author refers to the works of Philip, Fulton, Chapman, Plymley, Bladestade Kindersley, Anderson, Telford, and the article Canal, in the three principal Encyclopœdias ; but as the Members of the Municipal Committee may not at the moment have these works to refer to, I may mention, that it appears from the experience of others that the best coating or lining, for the sides of Tanks or Canals, is a soil consisting of argillaceous

and siliceous earths, well mixed together, both of which I have reason to believe are here everywhere abundant; at any rate, this much is certain, that about the depth of 20 feet, a blue clay and sand exists, and if not already fit for the purpose of puddling or lining, could be readily made so.

I have the honor to be, Sir,
Your obedient servant,
F. P. STRONG.

CALCUTTA,
17th February, 1838.

N. B.—Since the commencement of my inquiries, it has been ascertained satisfactorily that the whole soil of the Lakes possesses sufficient tenacity to admit of embankments in every direction.

June 18th, 1840

BISHOP'S COLLEGE PRESS.

Abstract of the Report.

THIRD REPORT

Of the Committee appointed by the Right Honourable the Governour of Bengal for the establishment of a Fever Hospital, and for inquiring into Local Management and Taxation in Calcutta.

To THE HONOURABLE THE DEPUTY GOVERNOUR OF BENGAL.

AT the conclusion of their First Report, your Committee stated, that they had not been able to extend their inquiries to the various questions relating to the Drainage of the Salt Water Lake, upon which the Government had been pleased to refer to them several papers—but that to the consideration of those papers, and the questions connected with that important and difficult measure, as well as to the reporting upon the new Clinical Hospital, your Committee would forthwith address themselves, making them the subject of a Supplementary Report.

Upon the questions relating to the Drainage of the Salt Water Lake, and arising out of the papers directed by His Honour the Deputy Governour of Bengal to be transmitted to them, your Committee have had the honour to report in their Second Report, of date the 7th August 1846.

At the close of this Report your Committee stated, that they had had the honour to receive a considerable time ago from the Government of Bengal, Papers relative to certain Municipal Laws, proposed by the late Mr. McFarlan, then Chief Magistrate of Calcutta, which the Government of India had directed to be forwarded to the Deputy Governour of Bengal, with a request, that the necessary communications relative thereto might be made to your Committee—that these papers were taken into consideration by the Honourable the President in Council on the 27th February 1838—that two of the matters only, to which the measures proposed related, the opinion of your Committee was desired upon, *viz* First, the necessity of proposing a Law for the regulation of Ferry Boats plying between Calcutta and the opposite bank of the River; and Secondly, A Law to prevent the obstruction of publick Ghauts—and that some further inquiry being necessary in regard to the practical means of regulating these Ferry Boats and removing this obstruction, your Committee would make these matters, and that of the new Clinical Hospital, the subject of a short Supplementary Report.

Your Committee accordingly now proceed to report upon them.

First; The Constitution of the Clinical Hospital and the amount of the actual and probable future benefits which are and will be derived from that Institution, and the addition to it of a Fever Hospital or Ward, which has been proposed by the Council of Education, in conjunction with your Committee.

The excessive insalubrity of the City and Suburbs, and the amount of medical treatment and care bestowed upon the Native population, have been stated by your Committee in their First Report, and will also be found in the Abridgement of that Report, printed in the year 1845.

From that Report it appears, that the medical and surgical charities existing previous to 1838 were the Native Hospital, the Calcutta General Hospital, the Police Hospital, the Leper Asylum, the Insane Hospital, and the Eye Infirmary—that of these the Police Hospital was only accessible to the entirely destitute, who were found helpless and houseless in the Streets, and who were carried there as a matter of Police by its Officers—and that the Native Hospital being intended for surgical cases, its accommodation for medical cases was necessarily very limited, and their admission not free from inconvenience with reference to its principal object.

These two Institutions, therefore, were the only ones which could contribute in any degree to the purpose of a General Hospital for the reception of Native patients—although the Police Hospital was open to the admission of European Male patients, as well as Natives of both sexes. The General Hospital is limited to the reception of Europeans and Americans under certain regulations, in addition to the patients it receives as a Military Hospital. Upon this institution your Committee were prohibited by the then President in Council, for reasons which are mentioned in their First Report, from reporting very full, and, as they thought, important inquiries which they had completed.

Appendix (K) page No. XXXIII. Appendix (B) page 16 No. 10. (B)

A Medical College having been opened in April 1835, the Council of that College submitted to the General Committee of Publick Instruction, on the 9th of March 1837, a Report, of which the object was to recommend that an Hospital might be established near the Medical College, in order that the pupils might have the benefit of Clinical instruction.

Ibid.—page 16 No. 10 (A)

The General Committee of Publick Instruction considering this arrangement very desirable and necessary, recommended it for adoption to the Right Honourable the Governor General in Council, by a Letter addressed to the Secretary to the Government, of the 15th of March 1837. This proposition was readily adopted by the Government.

Appendix (K) p No. XXXIII.

The proposed Clinical Hospital was opened in April 1838, consisting then of one Ward. Since that time it has been increased by subsequent additions to its present size.

Ibid.—page 26, No. XIV.

It consists at present of two Hospitals attached to the Medical College, and situated within its walls, the one for Males and the other for Females.

The former is a General Hospital for the admission of medical and surgical cases indiscriminately, with the exception of small-pox and contageous diseases: the latter is an obstetrick, as well as a General Hospital for women and children.

Upon this your Committee would remark, that it were advisable to separate the medical and surgical cases, and that there ought to be provision made for the reception of cases of small-pox, and contagious diseases. It should also appear advisable that cases of midwifery should be kept apart from those of women and children suffering under general disease.

Returns of Diseases treated in the male and female Hospital of the Medical College during the year from 1841 to February 1846, and the results, will be found in Appendix (K) from page 39 to page 75. It appears from these Tables that the number admitted during these years was, of Appendix (K) pages 57, to 62.

Europeans, ...	5,347
Of whom there died, ...	603
And were discharged, ...	4,536
And of Natives admitted, ...	5,149
Died, ...	550
Discharged, ...	4,620

These Returns do not show of the numbers discharged, how many were cured, and how many left the Hospital, either of their own accord, or as being cases which were considered to admit of no further treatment with the chance of success. It appears, therefore, that the amount of mortality, compared with the numbers admitted, may be taken at 9 per cent., and as nearly as possible equal in the cases of Europeans and Natives. But of the Europeans 75 per cent. are medical cases, while of Native cases the number of medical and surgical cases is nearly equal. At Rome, in an equally malarious country, though cooler climate, the deaths in Hospital are 10 per cent. In the General Hospital of Calcutta they are 14·6 per cent. [First Report suppressed sheets, page 213, Appendix (F).]

Making every allowance for the possible number of patients who left or were discharged uncured, the extensive utility of this Hospital cannot be doubted. Dr. Mouat states, that the great majority of the cases enumerated in the list either were discharged cured, or died—that some few left the Hospital before their cure was completed—but in general the opinion of the medical Officer guided them. Ibid.—page 27.

But it appears, that this Hospital is so far from being adequate to the reception of the patients who would willingly resort to it, that, from the Male Hospital being separated into two nearly equal divisions, one of which is assigned to Christians, and the other to Native patients, the largest and most numerous class of patients consists of European seamen, while the Hindoos stand only second in regard to number, the Mahomedans third, and the Native Portuguese Christians last: whereas, if there were more room, Dr. Mouat reports, that the Native patients would be by far the most numerous.

It appears that of Native patients the proportions of medical and surgical cases being nearly equal is the result of the inadequate accommodation afforded by the Hospital, not of an equality in the relative occurrence of the two great classes of disease.

Dr. Mouat says, that there is one Ward devoted to medical, and another of similar dimensions to surgical cases of Native patients, and that he has no doubt that a much larger number of both would be admitted, if the Hospital could contain them; and that certainly the preponderance in that case would be of medical over surgical cases. Ibid.

Nearly all the admissions, he says, are voluntary applications for relief; those from accidents, wounds, poisoning, &c. sent in by the Police, not being more than one in twenty. Ibid.—page 28.

He says, that the number of applicants for relief by far exceeds the means of accommodation afforded by the Hospital in the proportion of at least 3 to 1; and that the average monthly admission of Native patients is about 75, whereas, in even ordinary times of sickness, he has reason to believe, that at least 200 beds, if not a larger number, would be occupied. Ibid.

There can no longer, therefore, exist in the mind of any reasonable man the doubt, which your Committee long since thought themselves warranted to discard, viz., that there is any greater disinclination amongst the Native inhabitants of Calcutta than exists elsewhere, to the taking advantage of the benefit held out by a well-conducted Hospital in cases of medical and surgical suffering.

Appendix (K) page 4, No. 1 e.

Your Committee, therefore, will be excused for the deep regret they felt, and continue to feel, at the answer they received on the 10th of May 1843 from the then Deputy Governour of Bengal, to the wish they humbly expressed to be made acquainted with the intentions of the Government, relative to the contribution the Government was disposed to make in aid of the private subscription obtained for the establishment of a Fever Hospital, viz. that, adverting to present financial considerations, His Honour deeply regretted that Government was debarred from incurring any avoidable expense, although the Letter also said that His Honour was fully sensible of the importance of the object proposed by the Committee.

Ibid – page 2, No. 1. a.(1)

This Correspondence arose from a request addressed to the Chairman by the Governours of the Native Hospital, on the 21st of February 1843, that he would ascertain whether it would be consistent with the views of the Fever Hospital Committee to apply the Funds in their hands for the erection of a Fever Hospital, to the erection of a Fever Ward attached to the Native Hospital.

Ibid.—page 3 No. 1. c (1.)

The Chairman having laid this matter before them, your Committee thought, that, keeping in view their Report submitted to Government on the 7th of January 1840, it was proper, before replying to the proposition of the Governours of the Native Hospital, to submit that proposition to His Honour the Deputy Governor of Bengal, upon whose reply that of your Committee to the Governours would much depend.

Ibid.—page 3, No 1. d.

On the 5th of April 1843, the Chairman addressed a Letter to the Secretary to the Government of Bengal, transmitting to him copies of the Letters which had passed between the Committee and the Governours of the Native Hospital: and informing him that the subscriptions received for the Fever Hospital in the hands of the Committee's treasurer, the Union Bank,

amounted on the 31st December 1842, to Co's. Rs. ...	52,037	5	5
And that the amount of subscriptions not yet received was on the same date, Co's. Rs.	6,675	7	9
Total,	58,712	13	3

and, referring to the Report of your Committee, of date the 7th of January 1840, upon the manner in which the subscriptions for the Fever Hospital originated, and the grounds upon which they were obtained, the views taken by Government at that time on that subject, and their general Report relative to the establishment of a Fever Hospital, he stated that the Committee, not having received any intimation of the intentions of Government relative to the contribution the Government was disposed to make in aid of the private subscriptions obtained, thought they could not with propriety dispose of the Funds in their hands, which they had retained with the knowledge and sanction of the Government, without first obtaining the approbation of the Government.

Ibid. – page 4, No 1. e

In the Letter of the 10th of May 1843 above-mentioned, the Deputy Governour's full consent was expressed that the Committee should expend the Funds at their disposal, in such manner as might seem to them best fitted to carry out the views of the subscribers.

On the 25th of October 1843, Dr. Mouat, who is Secretary to the Council of Education, addressed a Letter to the Chairman, stating, that he was told that certain Funds belonging to the Fever Hospital Committee, which he styles by mistake the late Fever Hospital Committee, were then lying idle, that they were very much in want of a large Native Hospital to the Medical College, being from the limited size of their present Hospital compelled to send away a large number of applicants suffering from Fever, Dysentery, and a variety of other severe and dangerous maladies, and requesting permission to wait upon the Chairman upon this subject. Appendix (K), page 13, No. IV.

The Chairman had an interview with Dr. Mouat accordingly.

On the 26th of April 1844, the Chairman addressed a Letter to Dr. Mouat, in which with reference to Dr. Mouat's communication of the 25th of October preceding, he stated the correspondence of the Committee with the Government above-mentioned, and that the Committee had also received from the Governours of the Native Hospital an application of the same nature with that of the Medical College, and were, therefore, desirous of ascertaining, whether, if the money at their disposal were expended in the erection of a large Native Hospital, or Fever Ward, adjoining the Medical College, the Officers of that institution would undertake to afford to the patients, which such Ward might be capable of receiving, the requisite supplies of provisions and medicines, medical and other attendance necessary to their treatment. The Chairman had the honour to receive, under date the 8th of May 1844, the answer of Dr. Mouat; in which he stated, that the Medical Officers of the institution would gladly afford every aid and attendance to the patients of the Fever Hospital, and furnish it with Clinical Clerks, dressers, and every description of medical attendance, but that with respect to the supplies of medicines and diet, the Council had not the power of granting them without a special reference to Government, which had been sent in. Ibid.—page 14, No. IV. b. Ibid.—page 15, No. IV. c.

On the 11th of July 1844, Dr. Mouat transmitted to the Chairman the copy of a Letter from the Under-Secretary to the Government of Bengal to the Secretary to the Council of Education, under date the 8th of July 1844, stating that he was directed by the Honourable the Governour of Bengal to inform him, that, if the money now in the hands of the Committee were expended in the erection of a large Native Hospital adjoining the Medical College, His Honour would undertake to provide at the publick charge such establishment and medicines as might be necessary for the support of the institution. On the 6th of August 1844, Dr Mouat addressed a Letter to the Chairman, by direction of the Council of Education, informing him, that Baboo Muttyloll Seal had munificently presented to the Medical College a slip of ground, extending from the east gate of the College to College Street, as a site for the proposed Fever Hospital, should the Funds for its erection be placed at the disposal of the College. Ibid.—page 15, No. IV. d. Ibid.—page 16, No. IV. d. (1) Ibid.—page 16, No. IV. e.

On the same 6th of August 1844, your Committee met, and resolved, that the sum at the disposal of the Committee, together with such further sums as might be collected of the subscriptions not yet paid in, be appropriated to the erection of a Fever Hospital on the ground mentioned in the Letter under yesterday's [by mistake for this day's] date, to the Chairman from the Secretary to the Council of Education. Ibid.—page 17, No. IV. f. (1)

On the 26th of April 1844, the Chairman had addressed a Letter to the Secretary to the Native Hospital, in which with reference to that Gentleman's Letter of the 21st of March 1843, above-mentioned, he informed him of the correspondence with the Secretary to Government, of the application received from the Medical College, and the desire of your Committee, in order to enable them to dispose of the Fund in their hands, to ascertain Ibid.—page 18, No. IV. g.

whether, if the money were expended in the erection of a Fever Ward adjoining the Native Hospital, the Governours of that institution would undertake to offer to the patients such Ward might be capable of receiving, the requisite supplies of provisions and medicines, medical and other attendance necessary to their treatment. To this Letter the Chairman received an

Appendix (K) pages 18 & 19, No. IV h

answer from Dr. Stewart, Secretary to the Native Hospital, of date the 10th of June 1844, saying, that in reply he was directed by the Governours to state, that, should the amount be sufficient for the purchase of land, building a Ward, and the other necessary charges attendant on keeping up the Ward in a state of efficiency, the Governours would with pleasure undertake the management of such additional Ward.

Ibid – page 20, No VI

On the 28th of February 1845, your Committee received from Dr. Mouat a Letter, stating that the amount then subscribed for the proposed Fever Hospital, [in addition to the Funds in the Committee's hands,] amounted to Rs. 19,055 : 5 : . On the same day the above Letter, along with a statement of the Fever Hospital Funds, was submitted to a Meeting

Ibid —page 20. No VII. a.

of your Committee, showing an aggregate sum of Rs. 75,394 : 2 : 0 available for the erection of the proposed Fever Hospital.

Taking into consideration the undertaking by the Government of Bengal above-mentioned, and the saving of any outlay for the purchase of land, which arose from the munificent Donation of Baboo Muttyloll Seal, and also the advantage that would be derived from connecting the Hospital with the Medical College, for the purpose of Clinical instruction. and having had before them the plan of Capt. Goodwyn, the successor of Major Fitzgerald, drawn at the desire of the Council of Education in communication with the Members of the Medical College, with some other plans of a Fever Hospital which the Chairman had received from Dr. Strong, with the concurrence as he understood of the Secretary to the Council of

Ibid.—page 21, No. VII. (a)

Education, which plans he had submitted to Capt. Goodwyn for his remarks, and which plans, with those remarks, he submitted to your Committee, your Committee resolved, that they approve of the plan of a Fever Hospital by Capt. Goodwyn, and that, if the Council of Education are prepared to adopt, and will undertake the execution of the said plan, with such curtailments as the means available might require, the Funds in your Committee's hands should be at the disposal of the Council of Education.

The Chairman, therefore, by the direction of the Committee, transmit-

Ibid.—page 17. No. IV f. (1)

ted, on the 6th of August 1844, to Dr Mouat, Secretary to the Council of Education, a copy of the Resolution agreed to by your Committee on that day, and informed him, that as soon as the plan of the Hospital was finally approved by the Council of Education, and by your Committee, the Funds to the credit of the latter, in the hands of the Union Bank, would be made applicable to defray the expense of the building.

From this date to March 1847, no answer was received from the Council of Education.

Ibid.—page 22, No. VIII. a.

On the 16th of that month, the Chairman addressed a Letter to their Secretary Dr. Mouat, calling his attention to the Chairman's Letters of the 26th of April 1844, 30th of May 1844, 6th of August 1844, and 10th of March 1845, relative to the placing at the disposal of the Council of Education the Funds in the hands of your Committee, for the purpose of erecting a Fever Hospital, or Ward, contiguous to the Medical College Hospital, and to no answer having yet been received by your Committee, to enable them to make over the sum in their hands to the Council and, he said, if he did not receive such answer, he should take the opinion of the Committee upon the propriety of vesting in Government Security the sum thus in

the Union Bank, amounting to Rs. 60,313 : 14 : 2. In reply to this Letter he received from Dr. Mouat a Letter, dated the 30th of March 1847, acknowledging the receipt of the Letters mentioned by the Chairman, stating the reasons which had heretofore prevented the return of a definite reply to those Letters—that the Chairman was aware that the Government had undertaken to maintain and support the Fever Hospital in connection with the Medical College—that circumstances connected with the expediency of increasing the Medical College and removing it to a more favourable locality, had caused the building of the Fever Hospital to merge in the question of constructing a new Medical College, for which a very beautiful design had been furnished by Major Goodwyn, and in which provision had not only been made for a special Fever Hospital but for a Male and Female Hospital, &c—and that the whole of that question being then under the consideration of Government, the Council were not then in a position to return a definite reply to the Chairman's communication. He added, that the Funds collected by the Council of Education for building a Fever Hospital amounted already to Co's. Rs. 40,000, of which sum Rs. 2,472 were realized during the past year by interest from judicious investments, the greater part being then invested in Government Security, and that, should the Committee be disposed to make over in trust to the Council the Funds, then in the Union Bank, they would be happy to secure them in a similarly productive manner, and to guarantee, not only that they should be strictly devoted to the purposes for which they were collected, and that the structure should be ornamental to the City, as well as constructed with every modern improvement advisable and practicable, but that the Council would spare no effort in their power to cause the design to be carried into effect as early as possible. Appendix (K) page 22, No. VIII. b.

Major Goodwyn's plan was forwarded by Dr. Mouat for the information of the Committee.

On the 1st of April 1847, the Chairman put in circulation to the Members of your Committee a Minute, with which he circulated the answer of Dr. Mouat last mentioned, and requested the permission of the Committee, if they agreed with him in approving of this measure, to make over the Funds then in the Union Bank for the purpose of erecting a Fever Hospital to the Council of Education, in trust for the purposes, and with the guarantee mentioned in Dr. Mouat's Letter, especially stipulating that the Funds made over by the Committee to the Council of Education should be vested in Government Security. Ibid.—page 22, No. VIII.

He also circulated among the Members Major Goodwyn's design for the exterior and plan for the interior of the proposed building. He said that the Committee would observe, that the Wards of the proposed Fever Hospital were calculated to receive 350 patients at a time, capable at the average of 12 days for the duration of treatment in cases usually received in a Fever Hospital, of receiving in the course of a year about 500 patients, and that it was explained to the Chairman that the lower story was proposed to be vaulted for the circulation of air—that the lowest Wards for the reception of patients would be 15 feet above the ground—and that the expense of completing the Fever Hospital was estimated at a trifle above one Lakh of Rupees, which sum was already collected. To the request contained in this Minute of the permission of your Committee to make over the Funds in the Union Bank to the Council of Education, in trust for the purposes and with the guarantee mentioned in Dr. Mouat's Letter, and under the stipulation suggested in the Minute, the Chairman received the unanimous consent of your Committee. Ibid.—page 21, No VIII.

Appendix (K) page 23, No IX

The Chairman accordingly wrote to the Secretary to the Union Bank on the 14th of April 1847, directing him to transfer or pay over the Funds then in the Union Bank to the Council of Education.

Ibid.—page 24, No. X.

Of all these circumstances the Secretary to the Council of Education was informed by the Chairman on the said 14th of April 1847, and on the 23rd of April 1847 Dr. Mouat, the Secretary, wrote to the Chairman, that he was directed by the Council of Education to inform him, that they would gladly accept the trust on the terms mentioned, and spare no effort to procure a speedy and satisfactory fulfilment of the wishes of the Committee, and that the Funds should be duly invested in Government Securities.

Ibid.—page 24, No. XI.

Ibid.—page 76, No. XV. a.

The sum in the hands of the Union Bank, on the 22nd of May 1847, in account with your Committee, amounted by the Bank Books delivered to Dr. Mouat, inclusive of Sicca Rs. 7,000 or Co's. Rs. 7,466 : 10 : 8, in Government Securities, to Co's. Rs. 61,248 : 7 : 10, and the sums due by subscribers not then realized amounted to Co's. Rs. 6675 : 7 : 9, making in all Co's. Rs. 67,923 : 15 : 7.

Ibid.—page 38.

In his answers to the queries put to him by your Committee, for the purpose of enabling them to complete this Report, Dr. Mouat states, on the 13th of May 1847, that the Fever Hospital Fund which had then accumulated, amounted to 40,544 : 2 : 0, of which there had been expended in levelling the ground presented by Baboo Mutty Loll Seal and other casual expences, Rs. 177 : 14 : 3, showing a net sum in the hands of the Council of Education of Rs. 40,366 : 3 : 9. To this is to be added the sum above-mentioned, actually collected by your Committee and in the hands of the Union Bank, Co's. Rs. 61,248 : 7 : 10; showing the sum total now at the disposal of the Council of Education for the purpose of erecting the proposed Fever Hospital to be Co's. 1,01,614 : 11 : 7. Capt. Goodwyn's estimate for the Hospital designed by him, amounts to Rs. 1,30,000.

Dr. Mouat, in the above-mentioned letter of date the 13th of May 1847, states, that should the general proposal of removing the College itself be found impracticable, the Council trust, that the extension of the institution in its present position, and building a Fever Hospital, will be sanctioned by Government at an early period. Your Committee, therefore, trust, that, under the enlightened patronage of the distinguished persons now at the head of the Government of India, and of the Government of Bengal, the erection of this Hospital, one of the great objects of the long and anxious solicitude of your Committee, is in a fair way of being speedily accomplished; and it is impossible to bestow too much commendation on the benevolent exertions of the Council of Education and of their indefatigable and praiseworthy Secretary Dr. Mouat, in furtherance of an institution likely to alleviate so great an amount of human distress.

Ibid.—page Nos. XXXV. and XXXV. a and No. XXXVII. a.

The Chairman of your Committee received on the 19th of June and 22nd of July 1847, two Letters from Dr. Mouat of date the 19th of June and 22nd of July 1847, accompanied by a copy of a Letter from Major Goodwyn Civil Engineer to him, strongly recommending the abandonment of the present site of the Medical College and its Hospital and the fixing upon the ground now occupied by the General Hospital for the site of a new Medical College, and the General and Fever Hospitals proposed to be erected. These Letters were accompanied by specifications and estimates. The Chairman in answer to Dr. Mouat's Letters felt himself under the necessity of expressing his personal dissent from this proposal with his reasons for his difference of opinion, and lost no time in circulating among the members of your Committee the Letters of Dr. Mouat with their inclosures and a copy of his own answer to that gentleman. These with the observa-

tions of each member of your Committee in writing returned to the Chairman will be found in the Appendix.

Appendix (K) page 116 to 130, No. XXXIX. to No XLIV.

It will be seen that all the members of your Committee agree with the Chairman in deprecating the erection of the Fever Hospital on the site of the present General Hospital except Major Goodwyn, the original suggestor of the plan. The Chairman had the honour to receive from Dr. Mouat a reply to his letter, expressing his dissent from Major Goodwyn's Proposal, dated the 7th of August 1847, in which he states his opinion to be, that *if the ground on which the General Hospital stands were artificially elevated, perfectly drained, with a clear space of sufficient extent on every side, surrounded by no dead walls, and the neighbouring village kept in a state of salubrity instead of being the receptacle of filth, of which it has the appearance at present*, its position would be well adapted for the purposes of a New College and Hospitals attached to it. But he admits, that the distance from the Town and Port of Calcutta is the greatest and most formidable objection, and upon this, after more mature reflexion, he very candidly states that he is inclined to retract his former opinion and to coincide in the views of the Chairman and the Committee. All these papers are printed in the Appendix and have been transmitted to the Secretary of the Council of Publick Instruction, and it will be for your Honour on receiving their Report to decide this important and most interesting question.

Appendix page 127, No. X.

Pages 106 to 121, No. XXXII. to No. XLVI. inclusive.

Your Committee now proceed to inquire into the necessity of passing a Law for the Regulation of Ferry Boats; and a Law to prevent the obstruction of the publick Ghauts.

On the 23rd of September 1837, the Indian Law Commission, through their Officiating Secretary Mr. Grant, addressed a Letter to D. McFarlan, Esq., then Chief Magistrate of Calcutta, upon certain suggestions offered by that gentleman for the enactment of certain legal provisions connected with the Police of Calcutta. In his answers to that Letter Mr. McFarlan among other things refers to the Ferry Boats, and says, that he has had people brought before him on the ground of Boats being overloaded, and that no fines had ever been imposed on this class of cases, as undoubtedly there could not, there being no Law authorizing such fines. The want of such a Law was abundantly evident, and had long since been felt.

Addenda to Appendix (F) page 328, No 107, (C)

Ibid.—page 330 No. 107. (D)

Mr. McFarlan stated, that he had so far interfered as to stick up boards to caution persons not to obstruct Ghauts; that he was not quite sure whether a Ghaut should not be considered as a publick passage, under the 2nd Section of the Calcutta Bye-Law of November 1814; but to allow a Boat to remain fast to it for four hours, negatived its usefulness: he adds "We never punish in such cases."

It appears that the Indian Law Commissioners addressed on the 19th of January 1838, a Letter to the Government in reply to Letters to them from Mr. Secretary Macnaghten, relative to certain Laws proposed by the Chief Magistrate of Calcutta, and other matters connected with the administration of Criminal Justice in this City, and the Vice-President in Council came, on the 7th of February 1838, to several Resolutions thereupon, whereof the 2nd stated, that His Honour in Council saw reason to believe that a Law for the Regulation of Ferry Boats plying between Calcutta and the opposite bank of the River, is necessary for the preservation of the community from the dangers to which they are exposed from insecure, ill-found, and over-crowded Boats; but that he thought it advisable that, before any Legislative steps were taken, the Committee of Municipal Improvements be consulted through the Government of Bengal, in regard both to the necessity of the proposed measures, and to the provisions of the Laws, which, if a Law be called for at all, ought to be enacted: and His Honour in Council also resolved, that the subject of the Law proposed by the Chief

Ibid.—page 322, No. 107. (B)

Ibid.—page 334, No. 107. (F)

Magistrate to prevent the obstruction of publick Ghauts by Boats remaining a long time in front of them be also referred through the Government of Bengal to the Committee of Municipal Improvements.

Addenda to Appendix (F) page 324

Upon the question of these Laws, the Indian Law Commission in their Letter to the Government observe, that they have recommended in the Penal Code of Law, a Clause, which would make it penal universally to convey passengers in an unsafe Boat, whether the Boat be unsafe by being overloaded or otherwise. Your Committee cannot help being very humbly of opinion, that no such general Law would answer the purpose of a local enactment required for the Ferries of such a City as this, which ought to be drawn with due attention to the circumstances which require to be particularly provided against. With regard to the obstruction of Publick Ghauts, the Law Commissioners observe, in like manner, that this would be made punishable by the Penal Code; and upon this your Committee beg to report the same observation, that general Laws are not sufficient for establishing particular Regulations of Police, required by the actual circumstances of a particular City.

Ibid.—page 325.

With these views your Committee will proceed humbly to offer to your Honour their suggestions relative to the provisions of the Laws, which in their opinion ought to be enacted.

Appendix (I) page 55, No 35

The Chairman addressed a Letter to Mr. Patton Chief Magistrate, on the 12th of June 1845, in which he expressed his sorrow, that, very much through his negligence, and partly from his occupations, these two matters formed a part of those which still remained for your Committee to report upon; and stated, that he was desirous of obtaining the Chief Magistrate's opinion upon the necessity of enactments, upon both or either of these subjects—Secondly, the grounds for that opinion—Thirdly, his opinion upon the sort of investigation which it would be right for your Committee to institute, in order to report upon these matters—Fourthly, whether any old Bye-Laws or Regulations existed, or any Law had been lately passed, regarding them—And lastly, any other observations upon the subject with which he might think fit to favour him.

Appendix (K) page 56, No 36

To this Letter the Chairman had the honour to receive Mr. Patton's answer, dated the 26th of June 1845, in which he stated, that he was decidedly of opinion that a legal enactment was both proper and necessary. His reason for entertaining this opinion was the frequent accidents which occur on the River, attended in many cases with extensive loss of life, from the overloaded state of Ferry Boats, and their being ill-provided with Boat gear, and the inefficient manner in which they are ordinarily manned; but that the principal cause of those accidents was generally their being overcrowded.

Ibid.—page 56.

He said the prevention of this seemed to him to be the primary object that demanded attention, and for this purpose it appeared necessary, that there should be particular Ghauts fixed for Ferry Boats, and that these Boats should be numbered and registered, together with the names of the owners: that the capability of each Boat, as regards the number of men it is capable to hold with safety, should be carefully ascertained, and this number, as well as the registered number, should be painted in legible characters on some conspicuous part of the Boat.

In these suggestions your Committee cordially agree. With regard to the number of Ghauts, as well on the opposite side of the River as on the Calcutta side, to be fixed for Ferry Boats, the appointment of a sufficient River Police for enforcing the Regulations, and the penalties to be imposed on those who violate them, your Committee will presently address themselves to these questions.

The Chief Magistrate stated, that he was not aware of the existence of any old Bye-Laws or Regulations, or any Laws passed since the date of the Resolution of the Government, that had reference to the matter in question

With reference to the obstruction of Publick Ghauts, the Chief Magistrate was of opinion, that the proposed Law would be highly desirable, although it might be questionable whether the Government would consent to bear the expense that would be incidental to its efficient working. As regarded the Ferry Boats the Registry Fee, however small, would go to cover the expenses the carrying out of the Law would entail; but, as respected the proposed Law for the prevention of obstructions, there could be no income, and the State would have to bear all charges of establishment, &c. necessary to the purpose. Appendix (K)

In this your Committee entirely concur; but they humbly think, that the increase in the River Police Establishment, necessary for the Regulation of the Ferries, would enable that establishment, with a very small further increase of their number, to effect the purpose of keeping the Ghauts free from obstruction; and that any expense that might be necessary for this purpose would become not worthy of consideration, when compared with the very necessary object of keeping free from obstructions so great a Harbour, which is frequented by so large a number of Ships, and Boats of such various descriptions, employed in the service of this great commercial City, for the promotion of its wealth, and the accommodation of its inhabitants. Your Committee are of opinion, that the questions, which have been proposed for their consideration regarding the Regulation of Ferry Boats, and preventing obstructions of Ghauts, are intimately connected with the more general question of maintaining an efficient River Police. The whole subject they think your Honour will agree with them in considering as one of the most important of the many important matters connected with the welfare and prosperity of this City.

But your Committee will first call your Honour's attention to the information they have obtained relating to the two subjects particularly referred to them. Mr Patton having suggested, that the sort of investigation, which he thought it would be proper to institute in order to report upon these questions, should be the oral examination of those who frequent the River, and have opportunities of witnessing the accidents that frequently occur; and that such persons, he presumed, might be found in the Master Attendant's and Harbour Master's Departments, and among the Inspectors of Customs, and the better class of Preventive Officers; the Chairman addressed Letters accompanied with certain Queries, which will be found in the Appendix, to W. Bracken, Esq., Collector of Customs, to Captain T. E. Rogers, Master Attendant and Superintendent of Marine, to Captain E. Onslow, Harbour Master, to Captain W. Boothby, a Surveyor of Shipping, Captain E. Oakes, a Surveyor of Shipping, Captain G. W. S. Hicks, Superintendent of Police, Major F. W. Birch, one of H. M. Justices of the Peace, Rustomjee Cowasjee, Esq., one of the Members of your Committee, and E. Jenkins, Esq., Magistrate of Howrah, from whom respectively he received Answers to the Queries he had put. Your Committee were of opinion, that these answers were so full and satisfactory, that it was not necessary for them to pursue the matter further by oral examinations. Ibid page 56. Ibid.—page 76, No. XVI. Ibid.—No. XVII Ibid.—Nos. XVIII, XIX, XIX, a. Ibid.—No. XX Ibid.—No. XXI. Ibid.—No. XXII Ibid.—No. XXIII. Ibid.—No. XXIV Ibid.—No. XXV Ibid.—No. XXVI

Mr. Bracken states, that personally he must confess entire ignorance and utter inability to offer any suggestions on the subject under consideration, but he had been glad to avail himself of the knowledge in this respect of an intelligent Officer attached to his Department, Mr. E. O'Brien, the Head Inspector of the Preventive Service, and whose situation also as Supervisor of Dhonees, had afforded him opportunities of acquiring information that might be depended upon: he accordingly enclosed that gentleman's Answers to the Queries put by the Chairman.

His answers state, that there are only three Ferry Ghauts on this side of the River, and three corresponding Ghauts on the other side; that Boats are available at all times, from day light in the morning to 10 o'clock Ibid.—page 79 No. XVII, a

at night, and sometimes later in fair weather; that the ordinary fare is half a pice for each individual, in open Ferry Boats that carry 40 to 50 persons each, and one pice in the Dinghies that carry from 20 to 25 men each. He says there is a Rule fixing the number to each Boat, but from want of an efficient check it has become a dead letter: that the open Ferry Boats registered to carry from 20 to 28 persons each, take on board from 40 to 50, and Dinghies registered to carry 10 to 12 persons, convey over 20 to 25—that the rule is seldom or ever observed; the Manjees take over as many as they can crowd into their respective Boats—that the Boats plying for hire are, generally speaking, ill manned and otherwise ill conditioned, but that on this head the opinion of a Nautical man would be valuable. He says that accidents frequently occur from the Boats being inconveniently crowded during the freshes, and when it is blowing hard—that he has frequently at such times seen the gunwales of the open Ferry Boats within half an inch of the water's edge—that loss of life from the want of stringent Regulations very often occurs. He says, that all Boats whether Ferry Boats or plying for hire to take parties to and from Ships, or from one part of the River to another, should be numbered and registered—that the present system, he speaks from personal observation, is of no use whatever. It would, in his opinion, be advantageous to have the names of the owner and Manjee, number of the Boat, and the number of persons it is licensed to carry, painted on a conspicuous part of the Boat. He says he can scarcely venture to offer an opinion as to what other Regulations it would be expedient to enforce by Law; but he suggests the taking security from the owners or Manjees of the Boats, or from both, and the punishing by fine any infraction of the Law. He says, that the Ferry Ghauts he had already mentioned as the only ones, to wit Neemtollah, Armenian, and Colvin's Ghaut, on this side of the River, and the corresponding Ghauts, Sulkea, Howrah, and Ramkistopore Ghauts, on the other side, are dicidedly most convenient for the publick, and that there do not appear to be any restrictions necessary as to time except during spring flood-tides and the height of the freshes. In regard to the obstructions of the Ghauts he is not aware that there is any danger to be apprehended from the crowded state of the Ghauts, but that there is very great inconvenience occasioned by their being blocked up by Steamers, Accommodation and Cargo Boats, as well as by Natives bathing at them. To obviate these he thinks it would be necessary to establish the following or some similar restrictions.

First,—Certain Ghauts to be set apart for the Natives to perform their oblations at.

Second,—Other Ghauts for Boats to load and unload at.

Third,—Other Ghauts for Boats to ply at for hire.

Fourth,—To prevent Steamers, Accommodation Boats, &c. from making fast to the shore by chains or warps, also to make Boats lie between, and not at the Ghauts, whether laden or empty, and to leave a clear passage for Boats of all descriptions to pass up and down between the Ships in the moorings and the shore, and also from Burra Bazar Ghaut and Hautkhollah Ghaut to keep a clear passage.

He says, it is absolutely necessary that something should be done to keep this part of the River from being blocked up, as it is at present, by Up-country trader's Boats and Cargo Boats of all sizes and descriptions.

Appendix (K.), page 81, No. XX.

In regard to the Ghauts on this side of the River, from which the Ferry Boats regularly ply, Capt Onslow differs a little from Mr. O'Brien's account, stating that these Ferry Boats regularly ply from all the Ghauts, except 7 or 8, which he mentions: he agrees as to there being a proper fare, from half a pice to one pice, but states it to be according to the state of the weather: he concurs in saying that there is a Custom or Regulation in regard to the number of persons admitted into the Boats, but very badly arranged: the regulation number being far too many in a tide-way; never

stringently enforced, and now become a dead letter; that the Regulations commenced at Howrah; that the whole of the Boats belong to the Howrah side; that no licenses are given; and that there are no Regulations for this side of the River. He approves of the numbering and registering of the Boats allowed to ply as publick Ferry Boats. He is of opinion, that no Regulation can be made as to what number of Ghauts, and at what stations, ought to be fixed for the departure of Ferry Boats on the Calcutta side, or on the other side for their return, it being necessary for the Boatmen to accommodate themselves in this respect to the tide. He is of opinion, that there is more roguery committed, and more lives and property lost in proportion in the Boats plying from the Ghauts below Howrah Ghaut on that side of the River, than at the other Ghauts, owing to the fact of their being more out of the reach of the Howrah Police. Consequently the Boats are more overloaded; and frequently, he has no doubt, capsized for the sake of plunder. He concludes by observing, that no Law can be effectively carried out to remedy the many evils enumerated in the above Questions and Answers, without a good and efficient River Police, with a good, active, responsible person, as Registrar of Boats and Superintendent of that Police.

With regard to the obstructions of publick Ghauts, Captain Onslow says, that there is much inconvenience.

Capt. Clapperton, Capt. Boothby, Capt. Oakes, and Capt. Hicks, say that there are in truth no fixed Ghauts on either side of the River, from or to which these Ferry Boats ply, nor any fixed fares—that these Boats cross at all hours of the day, and in the fruit season nearly all night, and extort all they can get from the passengers: the proper fare being from half a pice to one pice, according to the state of the weather—that passages in such Boats can be obtained for half a pice or less in proportion to the ability of the passengers to pay, and that very poor people are taken gratis—that the Manjee leaves the Ghaut when he has obtained what he considers a sufficient sum to repay him for the trouble. Appendix (K) No XIX, a. Ibid.—No. XXI. Ibid.—No XXII. Ibid.—No. XXIII.

It appears from this account, that the owners and proprietors of these Ferry Boats are not subject to the jurisdiction of the Calcutta Police, except when they themselves or their Boats are on the River, or at a Calcutta Ghaut, and that the very proper and useful Regulations, said to have been made with reference to Howrah, have long ceased to be carried into effectual execution.

Captain Onslow agrees with Mr. O'Brien as to the condition of the Boats, and states that they are insufficient and deficient in all points, and that accidents frequently occur attended with loss of life and property to a considerable amount of both. Ibid.—page 84. No. XX.

Captain Clapperton says, that they are very inferior to the Gardwarry or Ferry Boats employed on the Ganges, and that many accidents occur from their being overloaded in rough weather and unskilful management, and that he has witnessed a small Boat, without a house choppah, conveying 30 or 40 passengers with only a single oar to propel her, besides the steersman's skull or steering oar. Ibid.—page 82. No. XIX, a.

Captain Hicks reports, that the Boats generally used are by no means good or sufficient, and are invariably ill appointed both in tackle and hands. Ibid.—page 89. No XXIII.

Captain Boothby differs from the account given by the other gentlemen, who have returned Answers to the Queries put with regard to the condition of these Boats. He says, that generally they are good, and also well manned, and *when properly laden*, he considers quite safe; *but that* Ibid.—page 86. No. XXI.

very few arrive at or leave the Ghaut in that condition. It follows, that he also must think very few of them safe.

Capt. Boothby says, that he knows from actual observation that not only much property, but many lives are lost every month from the want of Regulations, and people to enforce them. He says, that these losses occur by the upsetting of Boats from their being overloaded—that a very short time past he saved upwards of a dozen of people of both sexes who had escaped from a Boat that had sunk, and one of the people he questioned told, that the Boat was marked to carry 25 people, but that he had counted 36, and that the Manjee had been heard to say he had received fares for 42. It was supposed eight lives were lost in this Boat. He also says, that it was only three mornings since, whilst passing Colvin's Ghaut, he saw a Boat capsized by merely grazing over a vessel's cable. Now this Boat had not only a full compliment of passengers, but was also laden with baskets of vegetables to a great height, and so deep was the Boat, that there were not more than two inches of gunwale out of water. Fortunately the accident happened close in shore, otherwise he thinks it likely many lives would have been lost.

Appendix (K) pages 84, 87, 88, Nos XX. XXII, XXIII.

Capt. Onslow, Captain Oakes, and Capt. Hicks, are aware that accidents frequently occur from Boats being overloaded, by which great loss of life and property is frequently sustained, and that the frequency of these accidents may doubtless be attributed to the want of proper Regulations, which are very much required.

All the gentlemen who have answered the Queries, concur in the advantage that would result from a Regulation that the Boats allowed to ply as publick Ferry Boats, should be numbered and registered, and the name of the owner registered, and that these, together with the number of persons the Boat is licensed to carry, should be painted in legible characters on some conspicuous part of the Boat. It is generally recommended that the name of the Manjee also should be painted on the Boat. This perhaps might be attended with some difficulty and inconvenience, if the Manjee were the servant merely of the owner of the Boat. But it appears from Major Birch's account, that the Manjee is truly the hirer of the Boat, and as such its responsible manager.

Ibid.—page 83, No. XIX, *a*.

Captain Clapperton considers that a registry *of all* Boats employed upon the River is urgently required, and that the Boats should be numbered and registered with the names of the owner and Manjee, the number of oars or dandees, its burden in maunds, with the number of passengers it is allowed to carry;—the owner should give security to a certain amount before a license is granted to him, for which a corresponding fee might be charged to meet the expenses of a registry establishment—the number of the registry, with the weight in maunds, should be marked on the quarter of the Boat, and on the Ferry Boats the number of people they are licensed to carry—that the name of the owner and name of the Manjee should also be marked on the quarter of the Boat.

This act he considers should include all descriptions of Boats plying off town for hire; for if applied only to Ferry Boats it would easily be evaded.

Ibid page 86.

Capt. Boothby adds upon this subject, that if each Boat was marked with a paint line; how deep she could be loaded, much further mischief would be prevented—that the custom at present is for these Boats to get all the cargo they can, and then take their accustomed number of passengers, throwing out cheaper fare as an inducement. If a load mark was given to each Boat, this could not be done. To the same purpose Capt. Oakes says, I

consider it absolutely requisite that all Cargo Boats, Ferry Boats, Dhingees, and every description of Publick Boats, should be licensed, registered, and numbered in a very conspicuous manner on each side, both in English and Native characters, as also the number of persons they are allowed to carry, and the Ghaut they are allowed to ply from.

Capt. Boothby recommends as the only way of reforming the present system the establishing a regular Code of Rules, and the fixing upon particular Ghauts from which alone they would be allowed to ply, and at those Ghauts having an establishment purposely to *enforce* the Regulation. Capt Oakes believes, that nothing less than the employment of a respectable European Superintendent, and Peons under him, on the banks of the River, would have the desired effect, and this person should have an office and residence on the Strand, where parties could make their complaint either by day or night.

Appendix (K) page 86.

Ibid.—page 88.

Major Birch says, that he has all along urged the expediency of registering and numbering *all* Boats that ply upon the River, whether Ferry or Cargo Boats, and he thinks the name of the Manjee (not owner, as these Boats are all let out to Manjees and crews), together with its number and legal complement of passengers should be painted on some conspicuous part.

Ibid.—page 97, No. XXVIII.

Mr. Jenkins concurs in the expediency of having Boats of every description that are permitted to carry for hire, duly registered and numbered, with the name of the owner, and in passage Boats the number of passengers it is permitted to carry; and he says he has adopted this custom [in regard to the Ferry Boats] as far as it is in his power.

In his answer to the 5th Query, Major Birch draws a most lamentable, but it is to be feared not untrue picture of the apathy shown here in regard to rendering assistance by the crews of other Boats to persons in distress, in order to save the lives and property of those on board, and he proposes the enforcing some penalty on the crews of such Boats as refuse or neglect to render assistance to others in a state of peril. Your Committee think that the attempting to enforce such penalties would be found very difficult and inefficacious, and they would rather suggest the offering of suitable rewards to such as by their exertions should be the means of saving life or property.

Ibid.—page 97.

Major Birch concurs in the great inconvenience and cause of complaint arising from the crowding of Boats with cargo, and passage Boats, at the Ghauts, and recommends the allotting certain Ghauts for passage Boats, where Cargo Boats should not be allowed to put to, and certain other Ghauts for Cargo Boats, where the publick might be allowed to land, putting up with the inconvenience of detention; and he designates the Ghauts he would appropriate to these purposes. He particularizes several Regulations which merit attention.

He says that complaints are frequently made, and that the cause much oftener occurs without any complaint being made, of the behaviour of the Boatmen in *forcing* passengers on board their Boats, of course only in the case of women, and the weaker of their own sex. But he believes that many a poor fellow, who has been reported to have accidentally fallen overboard from a Dinghee on his passage to his Ship, has been forced while in a state of helpless intoxication on board a Boat, and then robbed and murdered by being thrown overboard and drowned. He thinks effective Ghaut supervision, with the numbering of all Boats, would put a stop to this forcing system, and save many a valuable life. If a person of the experience of Major Birch can believe in the existence of such frightful

atrocities, it seems high time that a sufficient River Police should be established.

Major Birch says, that the plundering of Cargo in transit has all along been very great—but he has considered the merchant alone to be blamed. Your Committee agree that great blame is imputable to the merchant, for entrusting valuable property to such persons as are mentioned by Major Birch, or, upon occasion of shipping goods, or landing them from shipping in the River, which have fallen under the observation of some of the Members of your Committee, to persons as incapable of carefully discharging the duty, and perhaps less trust-worthy. But this surely does not exempt the Government from the duty of giving to the transit of goods, in so large and important a Harbour, all the security which can be afforded by an active and vigilant Police, acting under efficient and carefully considered Regulations established by Law.

In regard to the number of Ghauts, and at what Stations, which ought to be fixed for the departure of such Ferry Boats from the Calcutta side, and at what times of the tide, and the number of Ghauts and Stations on the other side, which ought to be fixed, and at what times of the tide, there is some difference of opinion. We have already seen that Mr. O'Brien thinks, that the three Ghauts on each side, which he has mentioned, are most convenient for the publick, and that there do not appear any restrictions necessary as to time, except during spring flood-tides, and the height of the freshes. Capt. Onslow is of opinion, that no Regulation can be made on this point but that the Boatmen must accommodate themselves to the tide.

Appendix (K) page 80.

Ibid.—page 81.

Ibid.—page 86.

Captain Boothby considers four Ghauts on each side of the River would be ample for all purposes of traffick betwen Baboo's Ghaut and Nimtollah, and two at Cooly Bazar; and it would also prevent much confusion, and he thinks theft, if they were only allowed to leave this side at fixed times, say every hour between 5 A. M. and 7 P. M., after which nothing but regular Dinghies ought to be allowed to pass—he does not think it would be advisable to tie them down to any particular time of tide—only let the Boats be properly loaded, and there is no danger to be feared, more especially if the shipping were moored so as leave a clear space opposite each Ghaut. He says that much nefarious traffick is carried on through these Ferry Boats being allowed to pass free from enquiry at all hours, and he knows from experience that large quantities of opium, bang, and salt, and other articles are smuggled into Calcutta through these channels.

Ibid.—page 88.

Captain Oakes is of opinion, that the Ghauts fixed upon for regular Ferry Ghauts should be as clear as possible from the shipping at the moorings, to prevent accidents which frequently occur amongst the buoys, and that the time of departure of the Boats may be regulated by the Superintendent, as they now ply at all times of the tide. The number of Ferry Ghauts at present in use on the other side of the water he believes to be sufficient; these are Goolabarree, or what is termed Sulkea Ghaut, Howrah, Goladangah, and that at Seebpore.

Ibid.—page 90.

Captain Hicks says, that the four Ghauts named in his reply to the first query ought to be fixed for the departure of Ferry Boats on the Calcutta side, and Boats might with safety be suffered to start at all times except when the bore is expected to set in, and on these occasions they ought not to be permitted to quit within one hour of its appearance. He says, that the four Ghauts used on the other side will, he believes, answer every reasonable purpose, and he names them Sulkeah, Goolabaree, Howrah and Ramkistopore.

In regard to the obstructions at the publick Ghauts Captain Onslow differs very materially from Mr. O'Brien, as to the danger arising from this cause. He says that there is much inconvenience and danger, amounting to the destruction of life and property, arising from the obstructions at these Ghauts, and these obstructions have greatly increased at the principal Ghauts since a recent order prohibiting Budgerows and Beauleahs lying off the Esplanade, as well as from the publick Ferry Boats and private Dinghies at these and all other Ghauts. These obstructions and inconveniences may be obviated by many measures, and he mentions some, which he himself had suggested, and which will be found in his evidence. Appendix (K) page 58.

Captain Clapperton says, with regard to preventing obstructions at publick Ghauts, that, independent of the destruction of pucka Ghauts by allowing Boats to lie upon them when the tide is high, much inconvenience and damage to publick and private Boats occurs by the evil practice of blocking up the Ghauts. It seems to him therefore highly expedient, that all pucka Ghauts extending into the River, and intended to facilitate the landing of passengers should be marked off by strong posts running out to low water mark, within which line of demarcation no Dinghies or other passenger Boats should be allowed to remain but for the purpose of landing and embarking passengers. Ibid.—page 83

Captain Boothby says, that the amount of inconvenience occasioned by the indiscriminate use of the Ghauts of Calcutta is beyond conception, and in no part of the world have the dishonest so great facilities of carrying on their various practices afloat. He thinks that a Code of Laws could easily be framed, which, if honestly carried out, would effectually correct these manifold evils. He thinks much could be done by having rules laid down for the Regulation of Bhurs, Dinghies, Passage Boats, and Beauleahs, fixing the Ghauts at which alone they will be allowed to lie, and the times at which they will be allowed to traverse; having passes if requisite for extra hours. He says that the inconvenience to passengers by the indiscriminate use of the Ghauts is actually very great; but he does not think there is much danger or loss of life caused by it, and he considers all would be avoided if each class of Boats had Ghauts allotted to them for their particular use. Ibid.—page 87

Captain Oakes says, that the greatest obstruction in his opinion proceeds from Cargo and large Up-country Boats. These, when not employed, are moored in great numbers between the shore and the inner mooring buoys, from the Custom House to the Armenian Ghaut, so as to completely block up the passage, and cause all Boats on their way up and down the River to proceed outside the shipping and buoys, which sometimes is totally impossible from the strength of the tide, and exceedingly dangerous to attempt. The larger Boats when not engaged, should be moored two abreast in a line above the Armenian Ghaut at a sufficient distance from the shore, to allow of a passage in-side them. The Up-country Boats should land their cargoes above the shipping Ghauts. They are large unwieldy Boats, and not easily managed among ships and buoys in a strong tide-way. Ibid.—page 88.

Another great obstacle he says is caused by Boats of all descriptions lying at the Ghauts for hours together, blocking up the passage entirely, and preventing persons from landing without going over them. The whole of the banks of the River on the Calcutta side, from Chandpaul Ghaut to the New Mint, should be appropriated to the landing of goods, loading of Boats, and the embarking of passengers; the great inconvenience now experienced arising from the River frontage being occupied by private individuals. He concludes by saying, that for the last eight or ten years he

has been in the daily habit of landing and embarking from either the Armenian or Bebee Ross' Ghauts, which he says nearly join each other, and has very frequently been obstructed by the wrecks of Boats, spars, old guns, iron kentledge, broken anchors, &c., thrown out of Boats at any time of tide, and allowed to remain for days and weeks together, according to circumstances. Boats coming to the Ghauts at night are often belged by these obstructions; indeed a look at Bebee Ross' Ghaut at the present time would satisfy any one how needfully regulations are required on the banks of the River.

Appendix (K) pages Nos. XXVIII, and XXX.

Major Birch, and Mr. Jenkins, agree that there are not,—Major Birch says there never were—any Regulations regarding the number of persons to be admitted into the Ferry Boats with reference to their size.

Ibid.—page 101.

Mr. Jenkins says, he has made a Rule for the last 3 months upon this subject of his own authority, which, if it be in the power of a Magistrate in the Mofussil to make Laws of this nature, must be considered a great improvement so far as regards passengers coming from Howrah to Calcutta: but no such Rule can at any rate apply to those going from Calcutta to Howrah, who amount to an equal number Mr. Jenkins states, that he was induced to make this Rule by the frequent complaints made to him by passengers that the Boats they crossed in had been so loaded as to render them dangerous. He says, that Boats above 50 maunds are required to have 3 Boatmen and one Manjee. But he finds the Rule little attended to. He does not say by what authority the Rule is prescribed.

Ibid.—page 96

Major Birch thinks the Boats very well suited for the purpose, and sufficiently manned for the ordinary passage across, that is, carrying only their proper complement of passengers, but not when crowded with passengers, and at the season of the freshes and bores. He says they are then very unsafe. They never have more than three hands, oftener only two. Practically, therefore, they must be considered, in Major Birch's opinion, very dangerous Boats.

Ibid.—page 101

Mr. Jenkins states, that these Boats are in general but badly built, without any regard to their being sea-worthy; that they are built for hire with little care in the construction of them, and their having the requisite number of hands is little attended to The jurisdiction of the River being under the Chief Magistrate of Calcutta, he has no data respecting the loss of life and property, but is aware there are many accidents, particularly during the rainy season.

With regard to the loss of life and property from the want of judicious Regulations properly enforced, there is but one opinion, that this loss is very frequent and of great amount.

Ibid.—page 97.

Major Birch states, that accidents used frequently to occur, (meaning when the River Police was under his Superintendence) with loss of life he believes to a considerable amount, but particulars of the actual loss of life could seldom or ever be obtained; that if the Boatmen escaped with their lives they absconded for a time.

Mojor Birch reports, that during the year 1837, he took a census of the population of the City of Calcutta, and of the number of individuals entering and leaving the boundaries within the 24 hours. Those entering and leaving by the western or River side, amounted to either 12,000 or 16,000, but he is unable to speak positively as to which amount, no copy of these Reports, he regrets to say, being now to be found in the Chief Magistrate's Office, the originals having been sent in, and no copies kept.

Ibid. page 102

Mr. Jenkins reports, that from what information he could collect respecting the probable number of persons residing in Howrah, who daily

find employment in Calcutta, the following average may be depended upon as nearly correct.

Writers and persons engaged in different offices, ...	1,000
Coolees, workmen, women, &c., ...	2,000
Total, ...	3,000

He has also furnished your Committee with a statement, showing the number of persons, and also the traffick, which passed daily between Howrah and Calcutta on three days, from and to the two larger and more frequented of the Howrah Ghauts, and on two of the said days from and to the two less frequented Ghauts. The daily average number of persons crossing at the four Ghauts together was above 20,000. The number of Boats of all sizes, registered in the office of the Magistrate of Howrah, for the ferrying across this large number of persons, is 324. It appears that on each of these Boats the number of the Boat, and the number of passengers it is permitted to carry, are painted in legible Bengalee characters on the sides of the Boat.

It appears that these very creditable Regulations by no means answer the purpose of securing the sufficiency of the Boats, either in regard to their being well built, and sea-worthy, or their being properly manned, or free from the danger of being over-crowded with passengers. It appears that there are no sufficient means of enforcing these admirably meant Regulations at Howrah; and at Calcutta no such Regulations exist, or can exist without a publick Law.

It may well be that the number of passengers has increased greatly since Major Birch's census. The extent and population of Calcutta have increased greatly since 1837, when it is probable Major Birch's census showed the amount at 16,000, the whole number of persons daily entering and leaving Calcutta, being returned by that census at 175,000, in 1837. There seems no reason, therefore, to doubt the probable approximate average returned by Mr. Jenkins. So that the number of persons, who *must* cross and re-cross daily, is 3,000, and of those who actually do cross and re-cross daily, is upon the average 10,000, the safety of whose lives depends upon the Ferry Boats being placed under good Regulations, and efficient supervision. Mr. Rustomjee Cowasjee concurs with the other gentlemen examined in saying, that there are no fixed Ghauts from which passage Boats ply but that they ply according to the state of the tide; that there are no fixed times at which passage Boats can be obtained or fixed customary fares—that during the time when the laborers come from Howrah and return to it, the Boats are very generally most fearfully and dangerously crowded; that the fares vary from $\frac{1}{4}$ to $\frac{1}{8}$ of an anna, and this in the same Boat—the men being governed more by the number of applicants than any fixed rule: that no interference is ever offered to prevent their cramming their Boats to a sinking state; that the Boats are very slighly built, and the men very inefficient, while the crowded state of the Boat often renders it difficult to avoid danger, and utterly impossible to extricate her when once in a dangerous position; that from the want of Regulations upon the above subjects, accidents frequently occur attended with loss of life and property, he imagines, to a considerable extent. He agrees, that the Ferry Boats should be numbered and registered, and that the name of the owner, together with the number of passengers it is permitted to carry, should be painted in legible characters on some conspicuous part of the Boat, and that it should be provided that heavy fines be stringently enforced—that the Boats should be classed, and a fixed rate of hire established—that both Boats and men should be examined as to their efficiency every month. He adds several valuable suggestions of necessary

Appendix (K) page 98, No. VIII

Appendix (K) page 99, No. XXIX.

Regulations both in regard to the Boats and the Ghauts. He says, that there can be no doubt that an extensive system of plundering exists both as to merchandise, in shipping, and landing Cargo, and as to goods in transit. He is not aware that this is frequently or ever attended with murder or personal violence, but believes that suspicions of personal violence to seamen and others of a night have recently been brought to the notice of the authorities.

In answer to some further inquiries which the Chairman took the liberty of putting to Captain Hicks, he had the honour to receive from that gentleman a Letter under date the 31st of July 1847.

Appendix (K) page 105, No XXXI. a. Ibid.

Captain Hicks is averse to the Superintendence of the River Police being committed to a separate officer. He says, that the River Police has had quite as much of his attention as any other portion of the Police, and that it does not occur to him that its supervision and arrangement have ever been so irksome and laborious under the present new system and arrangement, as to suggest the necessity of its being placed under separate control. He says, it is not difficult to suppose that under the old plan this might have been otherwise, but that now the River Police Department derives very great assistance from the Town Police, and that a separation would, he thinks, render the duties more complicated and laborious for which he offers reasons which, without doubt, have much of truth to recommend them, but which do not appear, in the humble opinion of your Committee, to over-balance the considerations arising from the great extent of space placed under the superintendence of one Chief Police Officer—from the great number of persons engaged in depredations widely scattered over the whole of this space, more particularly upon the River, and at all hours of the day and night—from daylight affording upon the River but small protection from robbery and violence; and the great difference in the means of energy necessary to secure the safety of the River and Harbour, and those called for to preserve the peace of the city.

Your Committee are persuaded that no one man, whatever may be his qualities as Police Officer, can duly discharge the duties of both.

Capt. Hicks gives to your Committee the comfortable assurance, that since February 1846, not a single River robbery has taken place, nor has an occurrence of the sort been reported at the Police Office. Capt Hicks applies the observation generally to "gang robberies and thefts."

Your Committee have much pleasure in believing that with respect to gang robberies these are much less frequent than they were some few years ago, and they think this extremely creditable to the Magistrates and the Police: but they cannot think that no occurrence of the sort having been reported at the Police Office is conclusive evidence that not a single River Robbery has taken place, and with regard to thefts your Committee have no reason to believe that these are confined to petty thefts, but extend, as the records of the Supreme Court will show, to considerable depredations committed on valuable merchandise. Capt. Hicks agrees with Major Birch in throwing upon the mercantile community the blame of the frequency of these thefts.

In attributing much blame upon this head to the merchants, your Committee must again repeat, that their being in part to blame for the amount of theft committed upon their cargoes, in their transit between the Ships and the Ghaut, can by no means exempt the Government from giving to that transit all the security, which can be afforded by a vigilant Police, and efficient regulations established by Law.

Capt. Hicks is of opinion, that it would be advisable to place the Ghauts and Ferry Boats under proper management; and he thinks when proper Laws and Regulations shall have been passed, committing that management to the River Police, they could easily be carried into effect by increasing the establishment. He thinks the obstructed and filthy state of

the Ghauts and the many accidents and deaths which happen from the use of Boats not adapted for Ferry Boats, as well as the crowded state in which they ply to and fro, render the suggestion of measures of improvement worthy of the most serious attention. He regrets the not having been able to procure an approximate estimate of persons who reside in Howrah, but gain their livelihood in Calcutta, the various estimates given him by the different Manjees differing so widely, that he could not offer them as a guide. At one Ghaut the largest, (Meerbhur) it is calculated that about 250 people, residents of Howrah, cross and recross daily.

Your Committee think it sufficiently proved by the above evidence, that nothing can be supposed more lamentably defective than the provisions in force for the security of life and property in this great Harbour. It clearly appears, that there are no fixed Ghauts on this side of the River, from which publick Ferry Boats ply for the purpose of taking passengers across, nor any fixed times or fares established by Law or by Custom, at which passages may be obtained; but that Boats of various dimensions ply at all times from all the numerous Ghauts on this side, waiting for an indefinite time, to the great detention of many of the passengers, till they have obtained a sufficient, or usually more than sufficient, number of passengers for their remuneration; nor is there any Regulation in regard to the sufficiency and sea-worthiness of the Boats—their being sufficiently manned—or the number of persons who may be admitted into such Boats with reference to their size—on all which the safety of the lives of so many persons in daily transit depends.

It should seem that, on the other side, the places from which these Boats depart for Calcutta are more certain, being only four in number; but in all other respects the want of power to enforce regulations to ensure convenience and safety is the same. With regard to the sufficiency, and good appointment in tackle and hands, of Boats which ply as Ferry Boats, all the gentlemen, except Captain Boothby and Captain Oakes, and perhaps Major Birch agree in considering these Boats as generally insufficient, and ill found in tackle and hands. The gentlemen who say that the Boats are generally good, and well manned, and when properly laden quite safe, agree that they are so only when not overcrowded with passengers, which seldom happens, and when there are no bores or freshes in the River.

Upon the whole, it humbly appears to your Committee, that the Government is called upon, by every consideration of publick policy and humanity, to propose to the Legislative Council an enactment, which shall provide for the due regulation, not only of these Ferry Boats, but, from the information obtained by your Committee of the inconvenience and dangers caused, and the means of depredation and smuggling afforded, by the want of Regulations regarding them, of all other Boats plying in the Harbour for hire, whether for the conveyance of goods and passengers to and from the shipping, or for other purposes, and above all things the establishment of a good and effectual River Police.

With regard to Boats plying in the River forming the Harbour of Calcutta, for other purposes than that of ferrying passengers across, your Committee at a very early period of their proceedings obtained a copy of the Superintendent of Police's Report, then Captain Birch, to the Governour General, [illegible]

[illegible] with the answers returned by that gentleman to the queries now put to him, again to call the attention of the Government.

157 and 180. To this subject, your Committee in their First Report adverted very shortly.

They recommended that the jurisdiction of the Stipendiary Magistrates which then included cases occurring upon the River, [i. e. within the Harbour] should be extended over both banks of the River, and that the Superintendent of Police, (whose duties have always extended over the River and Harbour, as well as the landward part of Calcutta,) being relieved of the duty of the Collection of Assessment, be required to devote the whole of his time and attention to the executive duties of the Land and River Police and the collection of the Abkarree Tax. Your Committee also recommended, that an efficient River Police Establishment should be placed under the supervision of the Superintendent of Police, under the immediate charge of two or three European Constables: the present Establishment of River Police being, as they stated, very inadequate to prevent the plunder of property in transit to and from the ships, not to mention the other purposes to which that Police ought to be applied.

Your Committee are informed, that part of these recommendations have been adopted; but the records of the Supreme Court shew, that they have not succeeded in putting down these offences, of which complaints continue to be made, but attended with great difficulties in the detection of the offenders

Capt. Birch, in the paper above referred to, mentions the various stages in which goods are exposed to plunder, in their transit between the shipping and the wharfs, and many of the means by which that plunder is effected. He recommends that a registry should be made of all descriptions of Boats plying on the River Hoogly within the Jurisdiction of Calcutta, and that all the provisions of 2nd Geo. III. Chap. 28, should be adopted, and made applicable tothe Hoogly River Craft; which, he says, would tend greatly to the suppression of the pillage which now exists

Your Committee agree with Captain Birch in this recommendation, to the extent of taking 2. Geo. III. c. 28, as a model to be adopted for an Act to be passed by the local Legislature, with such curtailments and adaptations as may be necessary to render it suitable to the circumstances of this Harbour, and River; and in this Act should be inserted a clause empowering the Government to purchase all such Lands and Ghauts on the Banks of the River, as they shall deem necessary for the purpose of improving the Harbour, and the ferries, the compensation to proprietors, in case of dispute, to be assessed by a Jury.

Capt. Birch then goes on to consider the amount of the Police Establishment adequate to the duties to be performed. He recommends the Superintendent of the Calcutta Police, under the general controul of the Chief Magistrate, to be charged with the general supervision of the increased establishment, but to be vested with sufficient authority to deal with River offences.

Appendix (C) page cxiii. Upon this subject the late Mr. C. K. Robison, one of the Magistrates, said in answer to a question by your Committee, that he had stated to the Police Committee of 1829, and was still strongly impressed with the belief, that it would be a great convenience to have a separate Magistrate for the shipping, with Jurisdiction on both sides of the River; and he thought that the River Magistrate should have extended summary power, and have a separate office near the River, and be always in attendance. He was of this opinion from a knowledge of the great loss sustained by owners and masters of ships, from any delay in the decision of their cases, leading to the abandonment of prosecution, and consequent escape of the most determined

offenders. He adds, that all Lighters and Bhurs should be registered and numbered. He says the River Police has, in his opinion, been always neglected, and that a separate Magistrate ought to devote his whole time to it. He adds that the loss from plundering is very great.

On the 14th of March 1837 the Rajah Radah Kant Deb addressed a Letter to the Secretary to one Division of your Committee, in which, along with his several Answers to the Queries enclosed in the Secretary's Letter to him, he enclosed a copy of his, the Rajah's, Letter to Mr. McFarlan then Chief Magistrate, containing his opinion on the general state of the Town and Police; in which Letter he complains much of the Bombetias, or River Pirates, frequently committing depredations upon the Ganges [Hoogly]; and says that this was imputable to the utter inefficiency of the existing Guard Boat Establishment. He also complains that the Ferry Boats are totally neglected, from want of due attention in the Police Officers—that the Ferrymen neither keep large or secure Boats, nor employ proper Boatmen, or Manjees and Dandees, and overload their Boats with people or passengers, for their own interest, whereby the Ferry Boats are always liable to oversetting and sinking in the River, causing in every blowing season a shocking destruction of human lives. He says, he therefore deems it requisite to suggest that the necessary orders should be issued to employ regular Ferry Boats, and Ferrymen properly trained to their business, and to number and register the Boats, together with the name of the regular Ferrymen or Manjees, in the Police, as well as to fix the number of persons to be taken in each ferry boat, with a penalty on deviation from the rule. By so doing the lives of many poor individuals will be saved. Appendix (E) page 20 and 21

He complains much of the Dinghywallahs as a great nuisance to people desirous of crossing the River; insisting upon people getting into their Boats, and pulling and pushing and actually committing assaults on the persons resorting to the River side. They should, he says, also be registered, and the Dinghies numbered.

It appears, that an order was issued so far back as the 29th of June 1824, by the Magistrates to the Superintendent of the Strand Road, to prevent pins or posts being driven into the banks for the purpose of fastening Boats, and not to allow persons to cook on the bank, or to commit any nuisance upon it, and on the 4th of July 1831 an order was issued to the Overseer of the said Road, to cause Boats touching at the Ghauts, immediately to retire and leave the whole breadth free for the access of new Boats, which were to retire in turn to some other part of the bank. Appendix (·) Appendix (G) page 121.

It does not appear that these orders have ever been enforced.

It is certain, therefore, that the dangers and inconveniences caused upon the River, and in the Harbour, have been long known and complained of, obviously arising from the want of any regulations practically existing for their removal or prevention, and of a sufficient police establishment upon the river to enforce the provisions of the common law, and repress crime—a state of things which still exists; but for which adequate remedies ought without delay to be provided.

What the dangers and inconveniences requiring to be remedied are, appears sufficiently in detail upon the Evidence your Committee has laid before Your Honour, and your Committee would humbly recommend the appointment of a Commission, composed of some or all of the gentlemen they have examined, practical men acquainted with the nature of those dangers and inconveniences, in conjunction with the Magistrates, to point out in detail the Regulations they should concur in proposing, and the submitting to counsel these Regulations, together with the above mentioned Act

of Geo. III. and the suggestion of your Committee to insert a clause empowering the Government to purchase Lands and Ghauts on the Banks of the River, directing the learned counsel from these materials to frame a suitable Act to be presented to the Legislative Council.

POSTSCRIPT.—Your Committee since transmitting to your Honour their 2nd Report, have obtained several valuable papers connected with the subjects of that Report, which they have deemed it proper to print, and which will be found in the Appendix to their Report.

Appendix to Appendix (H.)

The importance of the Soondurbun Canals as a line of navigation, much more safe and convenient than the lower route by the Attarabanka, is stated in your Committee's 2nd Report, and the great necessity of keeping them perfectly navigable, and, together with their tow-paths, in an efficient state, may be seen from two of the above papers.

Appendix to Appendix (H) page No. 497.

In a Letter to the Secretary to the Military Board, dated 8th November 1837, Capt. J. Thomson, the then Superintendent of Canals, states that the south-west monsoon has been very severe in the Soondurbuns, and the number of Boats wrecked in the Roymungul and the Attarabanka, has exceeded any former experience: the amount of the loss may have exceeded two lacs of Rupees in the months of May and June last, and the traffick by all large loaded Boats was stopt for a time. Some of the loaded Boats attempted to come through the Soondurbun Canals, but grounded and went to pieces in the Chultabarya Canal, not only obstructing it for a time, but deterring others from attempting this safer passage.

Ibid.—page No. 514.

And in his Letter in the year following, dated 19th November 1838, Capt. Thomson states, that in May 1837, 400 *Boats of the average burthen of* 800 *maunds each,* were wrecked in the Attarabanka and Roymungul, Valuing these Boats at 1-8 each maund, including cargoes of grain and seeds, the estimated loss was about 4,50,000; the natives estimated the loss at six lacs. He says he stated in his Report No. 109, of the 8th November 1837, that the loss was probably 2,00,000.

THE END.